PIT AND QUARRY

MAY, 1942

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

for super-severe service

●

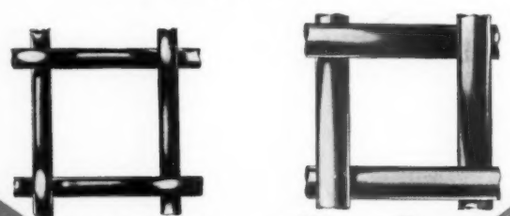
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

withstand abrasion longer—

endure vibration better—

resist fatigue to the utmost



The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

The LUDLOW-SAYLOR WIRE COMPANY SAINT LOUIS

MAY 22 1942

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MAY 25 1942
COPY

IN MINE HAULAGE:

What you don't know ~~won't~~ will hurt you

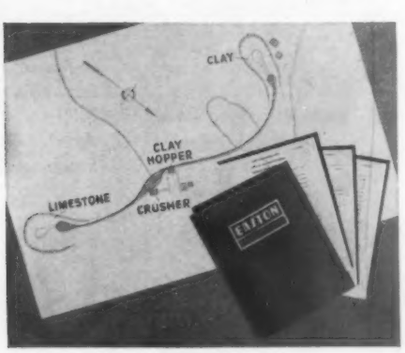
Above: EASTON TR-15H Trackless Mine Car. Average payload 22-25 tons. Hydraulic body hoist optional. Two other sizes. Write for Bulletin 175.

You're risking big money when you don't know where the pennies go...

A few pennies saved or lost on every ton of ore or rock you haul can make a five or six figure difference in your yearly operating costs. Just in dumping alone, seconds can rob pennies from every payload.

Perhaps you're too busy – particularly today – to go over the details of cost-per-ton. But, sooner or later, the time will come when what you don't know *will* hurt you.

Why not get a down-to-the-penny check-up on your haulage costs, by Easton industrial transportation engineers? An Easton Survey will cost you nothing and will incur no obligation. These experienced men can give you an unbiased report on either track or trackless haulage.

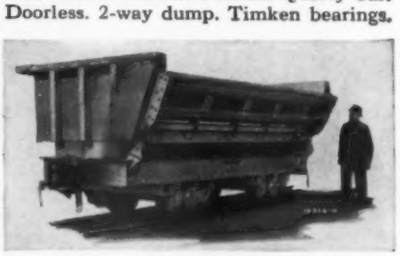


How Easton Can Help You

An Easton Survey will provide you with an accurately scaled map of your mine, pit or quarry, including haulage routes, location of shovels, crusher, etc. With this map will be a tabular analysis of routes, equipment and capacity; a detailed time-and-cost study covering every step from loading to dumping; and a summary of investments and depreciating periods based upon the most practical type of haulage for your service.

These facts will help you to plan ahead for new equipment. At the same time, the survey may point the way to immediate speed-ups and short-cuts with your present equipment. For complete information write to Easton Engineering Counsel.

The famous EASTON Phoenix Quarry Car. Doorless. 2-way dump. Timken bearings.



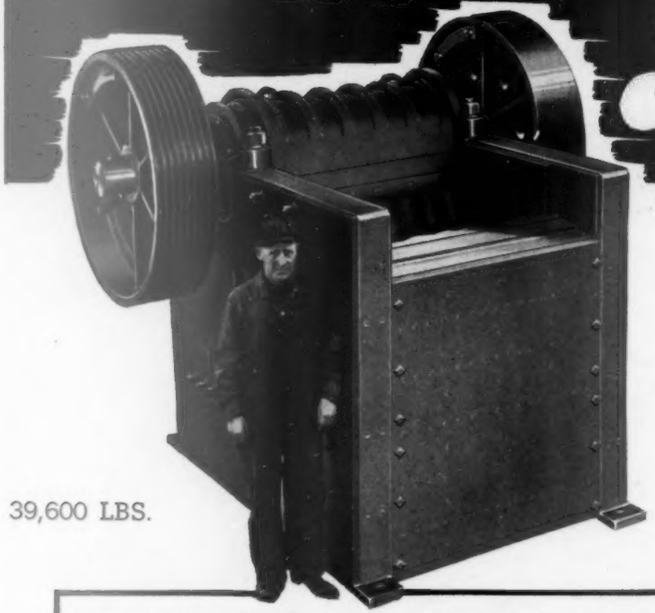
Above: EASTON Won Way Car. Below: EASTON Cornwall Car. Both have automatic down-folding door, Timken bearings.

EASTON

EASTON CAR & CONSTRUCTION COMPANY, EASTON, PA.

PIT AND QUARRY, May, 1942, Vol. 34, No. 11. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

IT WEIGHS 50% less



39,600 LBS.

The new Pioneer 30"x 42" Jaw Crusher weighs less than half as much as some Blake type crushers with the same size opening . . . and the Pioneer Crusher will take larger rocks and produce more capacity.

HERE'S WHY IT WEIGHS LESS

The old crusher had the eccentric in back of the lower end of the moving jaw and was 50% longer, and large and cumbersome.

Cast Iron
22,000 lbs.
Tensile
Strength
Per sq. inch.

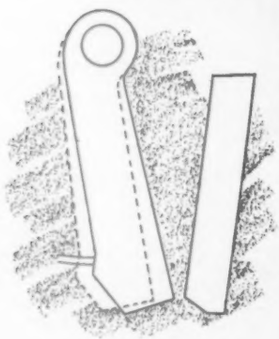
The old crusher was made of cast iron which required thick heavy sections. In spite of excess weight no additional strength was added.

The Pioneer Crusher has the eccentric at the top of the moving jaw and is compact. This feature permits a maximum of compactness.

Steel
60,000 lbs.
Tensile
Strength
Per sq. inch.

The new crusher is plate steel — is welded in box construction with double walls. Here additional strength is readily accomplished.

HERE'S WHY IT WILL TAKE LARGER ROCKS

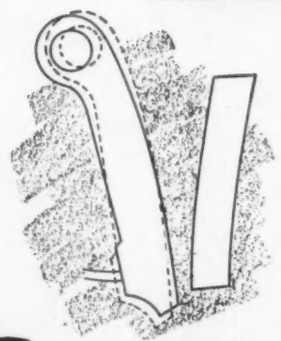


Cut No. 5

The Blake type (see cut No. 5) hinges at the top and rocks will ride on the top opening.

The overhead eccentric (see cut No. 6) is at the top and with a 1¼" stroke, it opens the jaw opening, allowing the rock to drop down where the jaws can grab it.

AND HERE'S WHY IT WILL PRODUCE MORE...



Cut No. 6

On the old crusher (see cut No. 5) the action is only at the bottom and gravity feeds the rocks thru.

The overhead eccentric (see cut No. 6) has a downward crushing stroke that forces the rocks thru the crusher — and on the upstroke, the lower edge crushes, giving a double crushing action.

Send for your *free* copy of our handy reference *"Facts and Figures."*

Pioneer
ENGINEERING WORKS
Minneapolis, Minnesota, U.S.A.

This Handbook
will help you

PROLONG THE LIFE and MAINTAIN PERFORMANCE of your LORAIN

All the facts
in "black and white" covering

OPERATION ADJUSTMENT
CARE . LUBRICATION

. . . condensed in one compact, easy-to-read volume.

IT'S FREE

to every Lorain owner and operator mailing in this coupon *filled out completely.*

THEW HANDBOOK
CRAWLER
LUBRICATION SCHEDULE
Mono-Crane Carrier Section
Rear Axles
Rear Axles
The Crane Carrier utilizes a straight-line through drive to two tandem worm-driven rear axles, mounted and coupled together as illustrated below.
This through drive permits engine torque to be divided equally between the two driving axles.
CARE AND ADJUSTMENT OF WORM GEAR DRIVING UNITS
Adjustment of Worm Shaft Bearings
THEW
LORAIN
Handbook
THEW CENTER DRIVE
Operation Section
Controls
The Controls
The entire Main Lever and Foot-Pedal Set-up for controlling all operations of Lorain 40-37-33-30-29-27 (both plain and "A" models) Shovels, Cranes, Draglines, Clamshells and Backdiggers is shown below. (See page 2 for further explanation).
A C D E G
B F
THEW HANDBOOK
Adjustment Section
Swing Clutches
B
211
A
X
Swing Clutches

THE THEW SHOVEL CO., Handbook Division, LORAIN, OHIO

Name.....

Company.....

Street.....

City.....*State*.....

Lorain Model.....*Serial No.*.....

GOOD BLASTING
Will Make It Last Longer!

Today, when additional equipment isn't available, and repair parts are hard, if not impossible, to get—it's becoming more and more difficult to maintain full production and prevent shutdowns. Proper use of explosives becomes more important than ever.

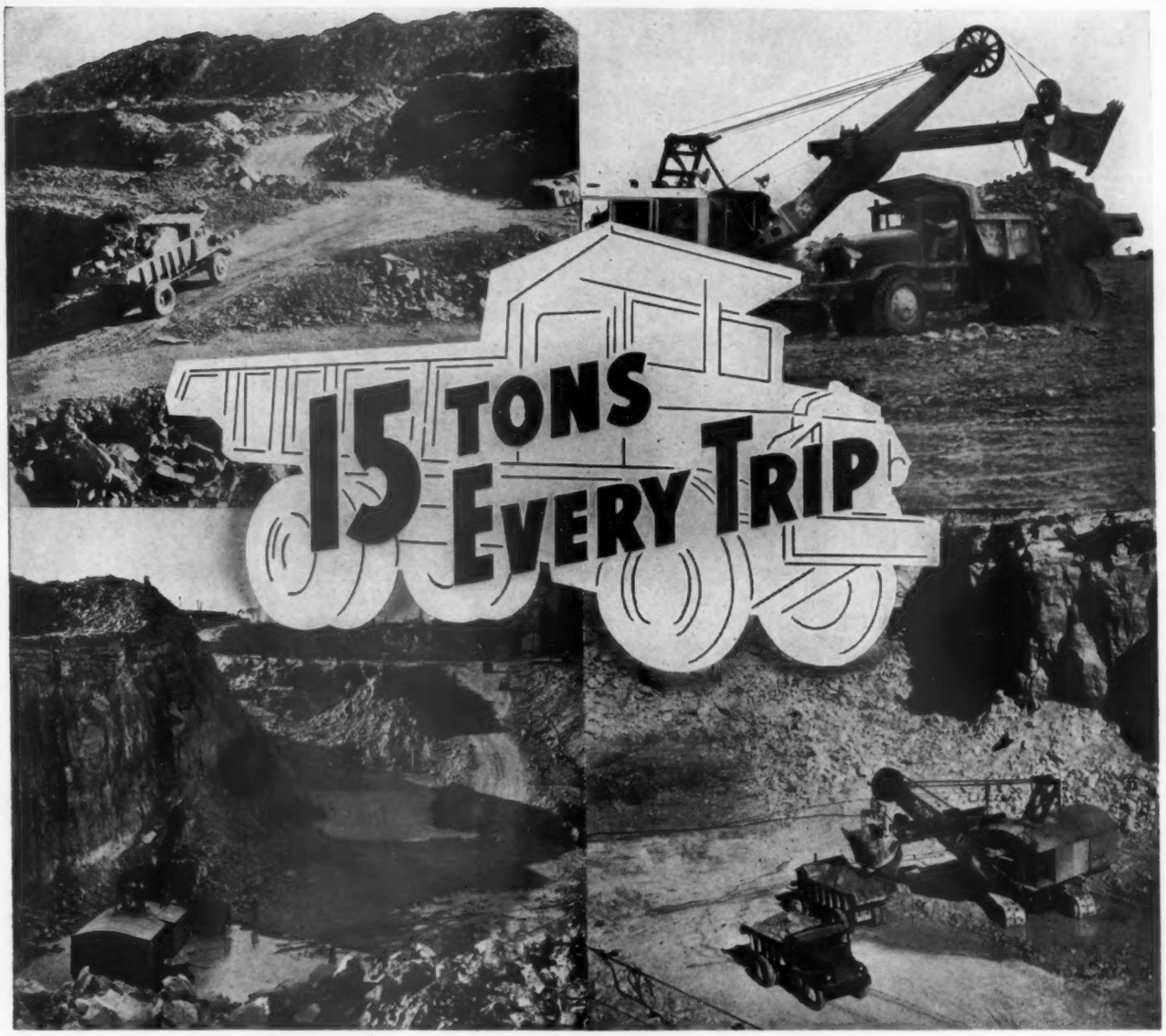
Better blasting usually means that shovels can be made to handle more, and last longer without repair.

Atlas Technical Representatives often have been able to help by cooperating on a study of blasting methods. They can help you, too—and are always at your service.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco



More and more mines and quarries are finding the 15-ton Model F Rear-Dump EUCLID the answer to their hauling problems. The design and rugged construction of this Euclid make it the ideal hauling unit for the "tough going" of mining, quarrying, and stripping operations.

With a capacity of 15 tons and plenty of power to climb steep grades fully loaded, Rear-Dump EUCLIDS cut hauling costs to new lows. Their quick, clean dumping action and wide range of travel speeds result in more loads per day and lower costs per ton hauled.

If you need new or additional equipment for hauling ore, stone, or overburden, be sure to check Rear-Dump EUCLID performance and production costs. Write for latest literature and specifications.

The EUCLID ROAD MACHINERY Co. • • Cleveland, Ohio

EUCLID

SELF-POWERED HAULING EQUIPMENT
For EARTH.. ROCK.. COAL.. ORE
CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

Safety's A GOOD IDEA

. . . but it CAN be overdone!

YES, even a good thing like Safety *can* be overdone. In fact it is being overdone in many plants today . . . overdone wherever standard thickness pipe is used for services that could be handled, easily, with a big margin of safety, by Taylor Spiral Pipe.

Actually the consideration in selecting standard pipe for such services could hardly be safety, or structural strength, or service life; for light wall, but rugged, Taylor Spiral Pipe offers all these in abundance. The explanation is found, more likely, in that time-honored custom of just ordering "pipe"—meaning standard thickness pipe — for almost every ordinary service.

This habit of considering standard pipe as the starting point on the scale of thicknesses available, costs American industry a lot of money — for in many cases the *installed* cost of Taylor Spiral Pipe is no more than half that of the pipe it could replace.

USE TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines.
- Low Pressure Steam and Air Lines.
- Steam and Diesel Exhaust Lines.
- Vacuum and Suction Lines.
- Blower Piping.
- Sand and Gravel Lines.
- Industrial Gas Lines.
- Oil and Gas Gathering Lines.
- Swing Pipe.
- Spray Pond Piping.
- Hydraulic Mining.
- Dredge Lines.

Some suggested uses for Taylor Spiral are listed opposite. Sizes range from 4" to 42"; thicknesses from 18 gauge to 6 gauge; joint lengths up to 40 ft. All types of end joints and couplings; all kinds of fittings and specials or fabricated assemblies are produced by Taylor Forge, thus assuring complete service and undivided responsibility.

Why not change to *job-selected* pipe on that next job—in other words, why not change to Taylor Spiral? It saves steel and dollars — always important; now vital. Write for Catalog 404.

TAYLOR FORGE & PIPE WORKS

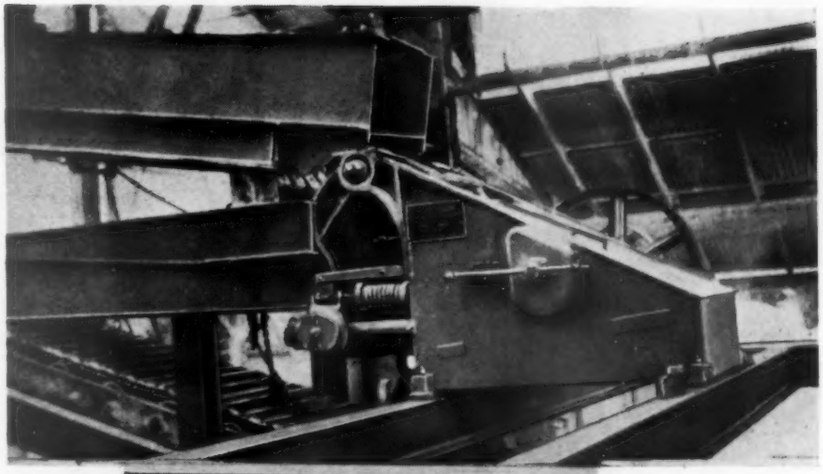
General Offices & Works: Chicago, P. O. Box 485 • New York Office: 50 Church St. • Philadelphia Office: Broad Street Station Bldg.

TAYLOR *Spiral* PIPE

• Other Taylor Forge Products include: WeldELLS and a complete line of other Seamless Steel Fittings for Pipe Welding; Forged Steel Flanges; Forged Steel Nozzles and Necks for boiler and other pressure vessel outlets; Heavy-wall Electric-Weld and Forge-Weld Pipe; Seamless Rolled Steel Rings; Corrugated Furnaces, and similar forged and rolled steel products.

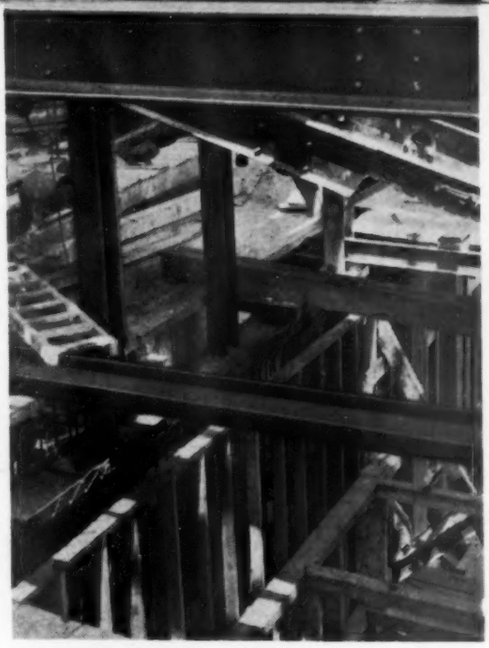
3 STORIES HIGH!

(NO FOUNDATIONS)



The savings in building construction alone almost paid for the KUE-KEN on this job. Further savings were made possible by placing the KUE-KEN up on top and providing a gravity feed to the rest of the plant. This eliminated unnecessary elevators, etc.

Installations like this are possible only with a KUE-KEN balanced crusher. Perfect balance of *every* moving part in a KUE-KEN eliminates the need of heavy expensive foundations.



The KUE-KEN principle of crushing *without abrasion* is giving owners from 5 to 10 times more tonnage per set of jaw plates than ordinary crushers previously used on the same job. (We guarantee at least *three* times as much or a set of jaw plates free!) On *every* job where a KUE-KEN has replaced other makes of crushers, the capacity on a horsepower basis has increased two to five times and giving them finer crushing too. We will gladly refer you to users who are getting these results. A simple safety device, without shearing or breaking parts, protects the crusher from tramp iron. An automatic pressure switch shuts down the crusher in case of any possible oil failure. The best possible proof we have of the satisfactory service KUE-KEN crushers are giving are repeat orders from owners who are increasing production to meet today's war needs.

The following claims are backed by a money-back guarantee. Less jaw plate wear, more capacity per horsepower, greater reduction in a single pass, less lubrication cost.

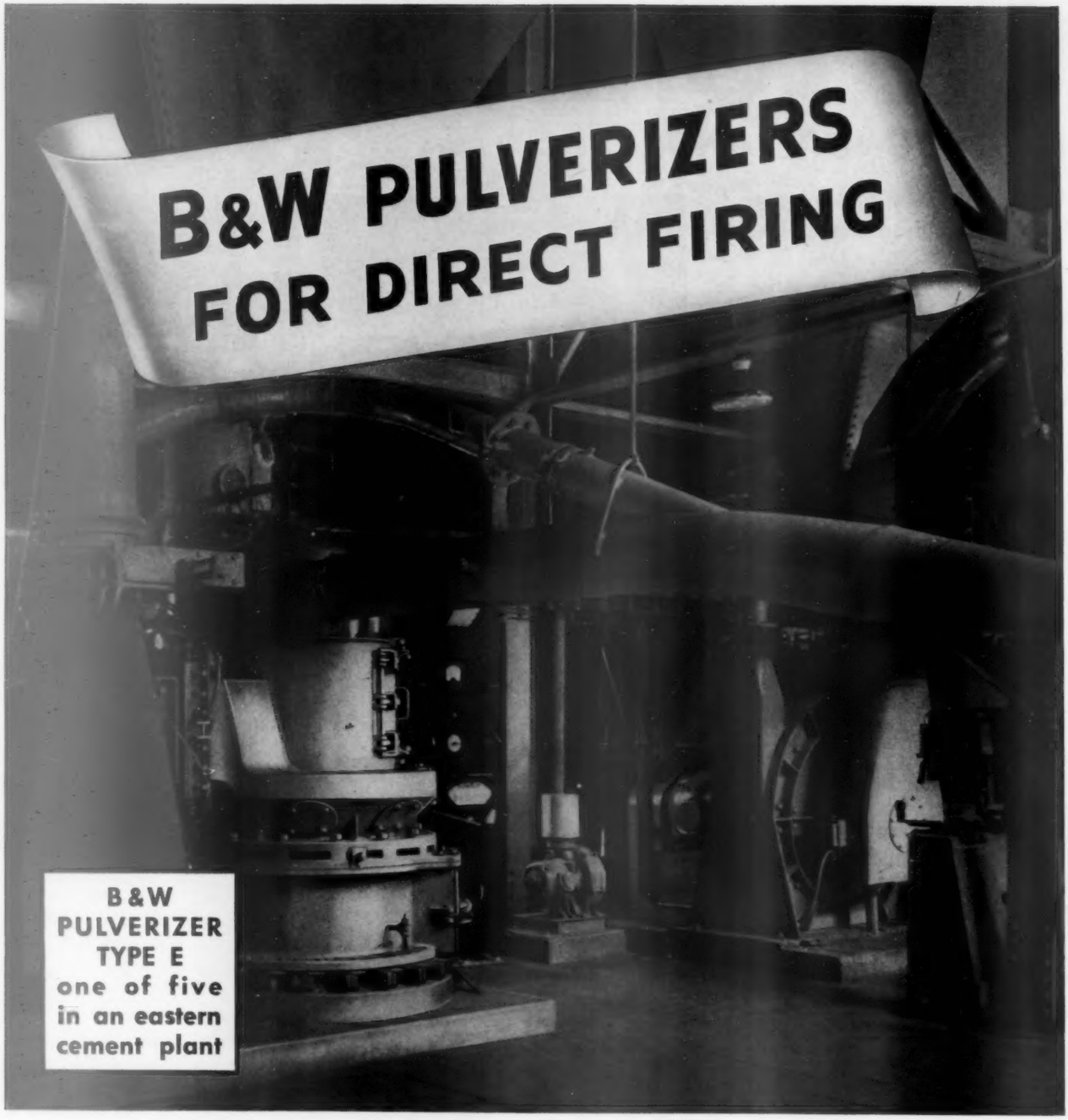
We build the KUE-KEN crushers in several sizes from 5 to 50 tons per hour capacity. KUE-KEN is the only crusher that crushes without abrasion.

Write today for Bulletin 602 which gives complete details.

401 CHESTNUT ST., OAKLAND, CALIF.

STRAUB MFG. CO.

Kue-Ken Balanced Crushers	Rib Cone Ball Mills	Screenwheel Classifiers
Overhead Eccentric Crushers	Feeders	Amalgamation Barrels
Concentrating Tables	Spiral Classifiers	Standard or Sectionalized



B&W PULVERIZERS, TYPE E,
ARE AN IMPORTANT AID IN
MODERN CEMENT MANUFACTURE

THE BABCOCK & WILCOX COMPANY, 85 LIBERTY STREET, NEW YORK, N. Y.

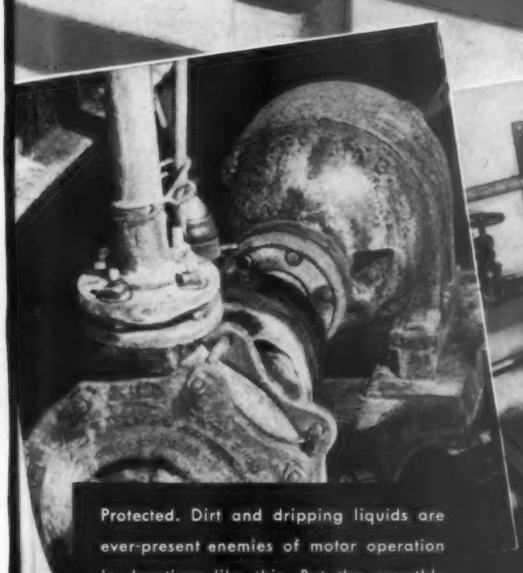
C-48

BABCOCK & WILCOX

MORE "STAYING POWER"

ON PUMPING JOBS

Triple-shift operation is an old story to this Tri-Clad motor driving a coolant pump. Tri-Clad motors are now available up to 100 hp in standard, open construction, and in a wide range of other types and ratings.



Protected. Dirt and dripping liquids are ever-present enemies of motor operation in locations like this. But the smoothly contoured, cast iron frame of this Tri-Clad motor guards it against damage.

Long Lasting. This Tri-Clad motor is an excellent running mate for the chlorinating pump it drives. Its extra-protection features—cast iron frame, windings of Formex wire, improved bearings—are assurance of long life on important jobs.

BUILT FOR PROTECTION FIRST..TO LAST

The extra protection of TRI CLAD MOTORS helps keep pumps delivering

NOW—before you buy motors—is the time to solve your pump-motor problems. Wherever continuous pumping is essential to your production—wherever pumps must operate under adverse conditions—your motors must be secure against 1) physical damage, 2) electrical breakdown, 3) operating wear and tear.

Here's where the *extra*-protection features of Tri-Clad motors will help you get the triple-shift operation you need. Their cast-iron frames and end shields exclude falling objects and dripping liquids; their windings, of Formex wire, are resistant to oil, moisture, and heat shock; their improved bearings, completely sealed in cast iron, are protected against the entry of dust and dirt. All these features add up to *extra staying power* on jobs where 24-hour production is essential.

How to Get Motors Quicker

USE STANDARD MOTORS. Wherever possible, select standard, open, sleeve-bearing motors. Building fewer "specials" means faster and greater production of motors for war work.

PLACE ORDERS EARLY. Order the motors when you order, or plan for, the equipment they are to drive.

SEND PROPER PRIORITY. Be sure correct priority papers accompany your order and that the priority rating reflects the urgency of the motor's use in the war.

CHECK G.E. for warehouse stocks. A supply of many standard motors are kept on hand to meet urgent war needs. Perhaps the motor you want, or can use with a few simple changes, is available for immediate shipment.

General Electric, Schenectady, N. Y.

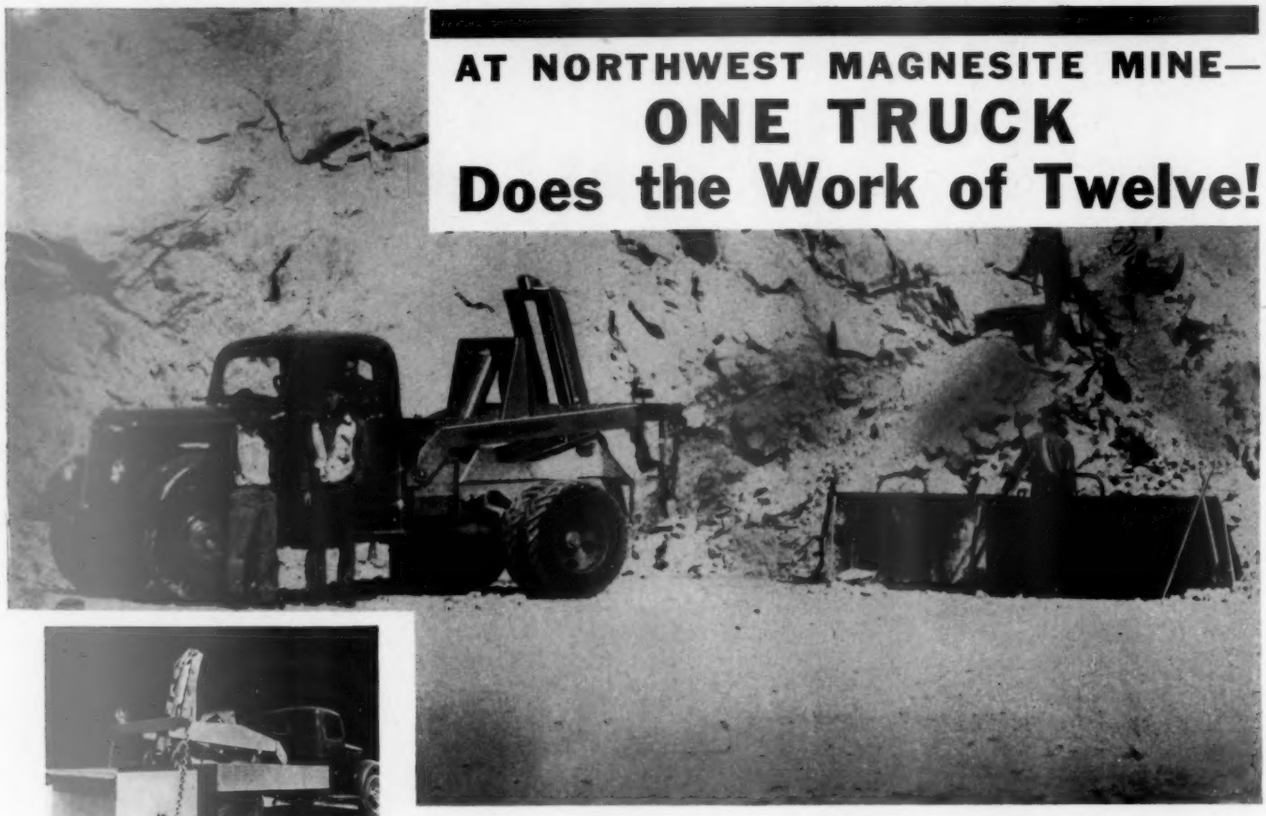
General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

GENERAL ELECTRIC

750-107-8030

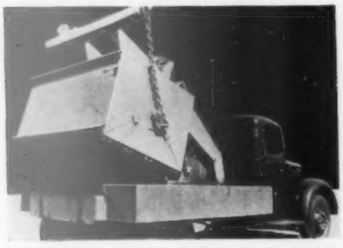
AT NORTHWEST MAGNESITE MINE—

ONE TRUCK Does the Work of Twelve!



The DEMPSTER-DUMPSTER Picks up a loaded body . . .

Hauls it . . . Dumps it . . . and returns the "empty" for another



"pick-up" while other Detachable Bodies are being loaded.

—an Example of How YOU Can Cut Hauling Costs with DEMPSTER-DUMPSTER

When Northwest Magnesite Company put DEMPSTER-DUMPSTERS to work they found that one skip for ore and one for waste kept each two-man crew busy, and one truck equipped with a DEMPSTER-DUMPSTER Hoisting Unit keeps twelve to fifteen skips emptied. No wasted effort! No loss of time! And a considerable saving in original hauling equipment, as well as in hauling cost!

Let DEMPSTER-DUMPSTER Increase Your Profits

Equip just one of your trucks with a DEMPSTER-DUMPSTER Hoisting Unit, and get as many DEMPSTER Detachable Bodies as you may need—then see how you save on man-power, save on truck maintenance, save gasoline, save tires! You will find very soon that DEMPSTER-DUMPSTER keeps materials moving, with less effort, lower cost, and bigger profits!

If you have a material handling and hauling problem, tell us about it now, and let Dempster engineers work out a plan that will cut your costs and increase your profits. Write TODAY.

DEMPSTER DUMPSTER

—a Hoisting Unit which fits any Truck Chassis, and a variety of Detachable Bodies which fit any material handling or hauling job.

DEMPSTER BROTHERS, INC.

Knoxville • Tennessee

HAZARD LAY-SET Preformed is *Preformed*

A Direct Quotation from MODERN WIRE ROPE DIGEST

PREFORMED Rope Bends More Easily

Much of the lack of resistance to bending fatigue in a non-preformed wire rope of any grade is due to the unresolved stresses introduced during the fabrication of wires into a rope—stresses that so react that they prevent the attainment of maximum resistance to bending fatigue. If wires are relieved of the tendency to fly away from the rope, the only factor determining resistance to bending fatigue is the natural resistance to bending, resident in the wires themselves. A PREFORMED rope bends more easily and with less additional stress on the metal. Therefore, a PREFORMED wire rope may be bent more often than one that is non-preformed.

Illustrating the strained position of wires in a non-preformed wire rope

Wires in a preformed wire rope lie at ease

PAGE 59

● More and more operators in practically all fields are recognizing the superiority of Hazard **LAY-SET**. They know that **LAY-SET PREFORMED** not only bends easier and thereby lasts longer, but that it handles easier, faster and safer. It resists kinking and whipping; practically refusing to rotate in sheave or drum grooves. For longer life and better service specify Hazard **LAY-SET PREFORMED** Green Strand. The Green Strand identifies the grade of steel as Improved Plow Steel.

GREEN SIGNIFIES SAFETY

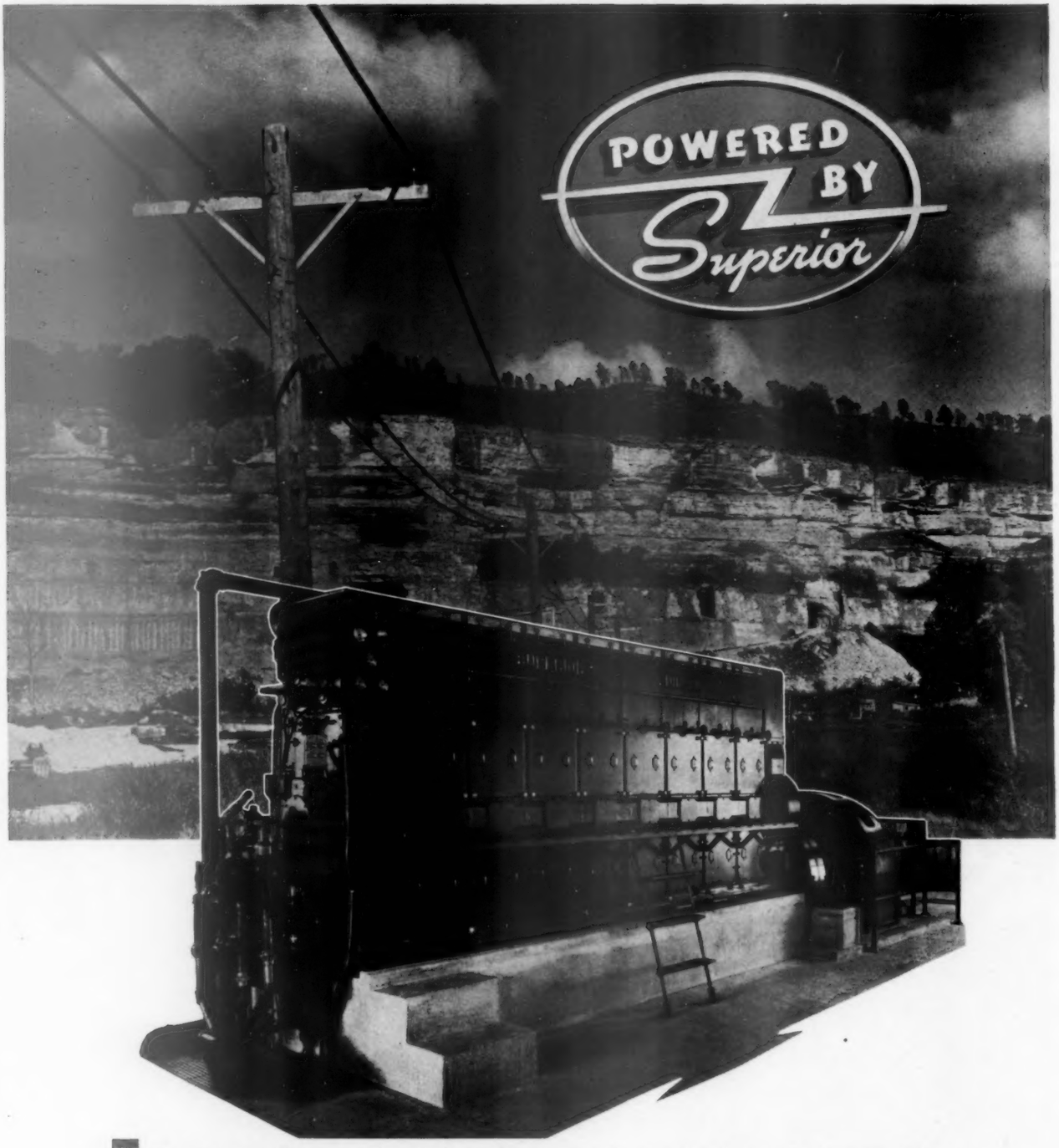
HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT, CONN.

HAZARD LAY-SET *Preformed* WIRE ROPE

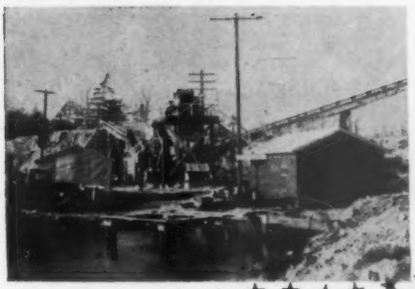


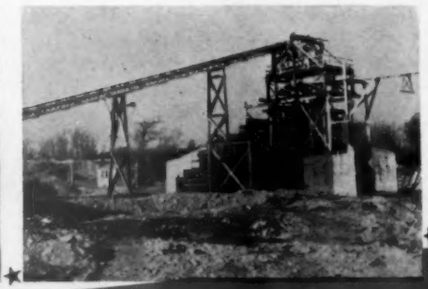
THE story of Superior Diesel power in quarries, rock crushing plants, dredges, sand and gravel pits, is a story of dependable performance and exceptional economy — larger earnings and increased profits.

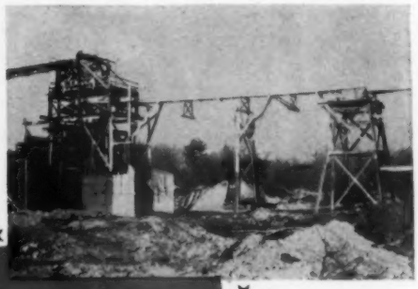
Write us without fear of obligation for the facts and figures on what Superior Diesels have accomplished for others in your industry.

THE NATIONAL SUPPLY COMPANY... SUPERIOR ENGINE DIVISION

SALES OFFICES: Springfield, Ohio; Philadelphia, Penna.; New York, N. Y.; Los Angeles, Cal.; Jacksonville, Fla.; Houston, Texas; St. Louis, Mo.; Fort Worth, Texas; Tulsa, Okla.; Boston, Mass. FACTORY: Springfield, Ohio





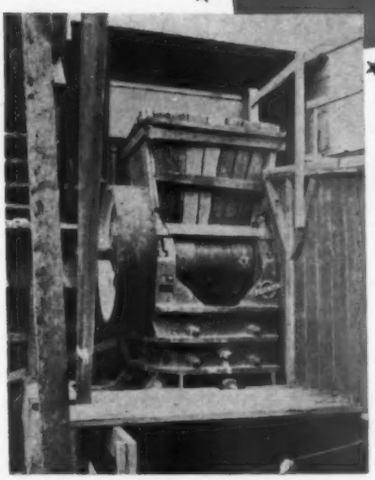


250 TONS PER HOUR

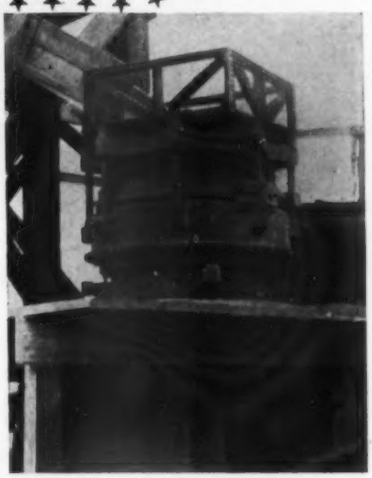
Keeps War Construction Moving

Crystal Concrete Co. of South Braintree, Mass., has another Telsmith gravel plant. This new one, near Weymouth, was erected solely to supply war projects. Production was started at the rate of 175 tons per hr. After a short "breaking-in" period, regular production will go up to 200 to 250 tons per hr. In the pinch . . . when win-the-war work calls for top speed and peak production . . . experienced operators depend on Telsmith equipment. You can, too. It will pay you to get Bulletin G-15.

TELSMITH



Telsmith 18 x 30 Roller Bearing Jaw Crusher (left) handles plus 3¼" material. It is fed by Telsmith 30" x 5'6" Reciprocating Plate Feeder over a Telsmith No. 450 Rotary Grizzly with 3¼" spaces. Feeder takes raw bank material from 15 cu. yd. hopper fitted with a rail grizzly to reject the few oversize boulders. Crushed material, and minus 3¼" from Rotary Grizzly are conveyed to scalping screen (lower left).



Telsmith 4' x 10' Single Deck Pulsator (lower left) acts as a scalping screen. Minus 2" throughs go to finished product conveyor; plus 2" oversize into Gyrasphere Crusher (right).

Telsmith No. 36 Gyrasphere (upper right) crushes oversize or plus 2" fed to it from the Telsmith Scalping Screen (left). The crushed product is returned to the 30" x 87' primary conveyor by an 18" x 48'6" belt conveyor.

Telsmith 5' x 12' Triple Deck Pulsator (right) in structure over storage piles, sizes the gravel and sand. The 3 sizes of washed gravel are deposited over tunnel at grade level for truck loading from live storage, or by loader outside stock piles. The sand is flumed to a No. 8 Telsmith Sand Tank independent of main structure, for stock piling. G-9

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Seagworks, Milwaukee—Concrete, London

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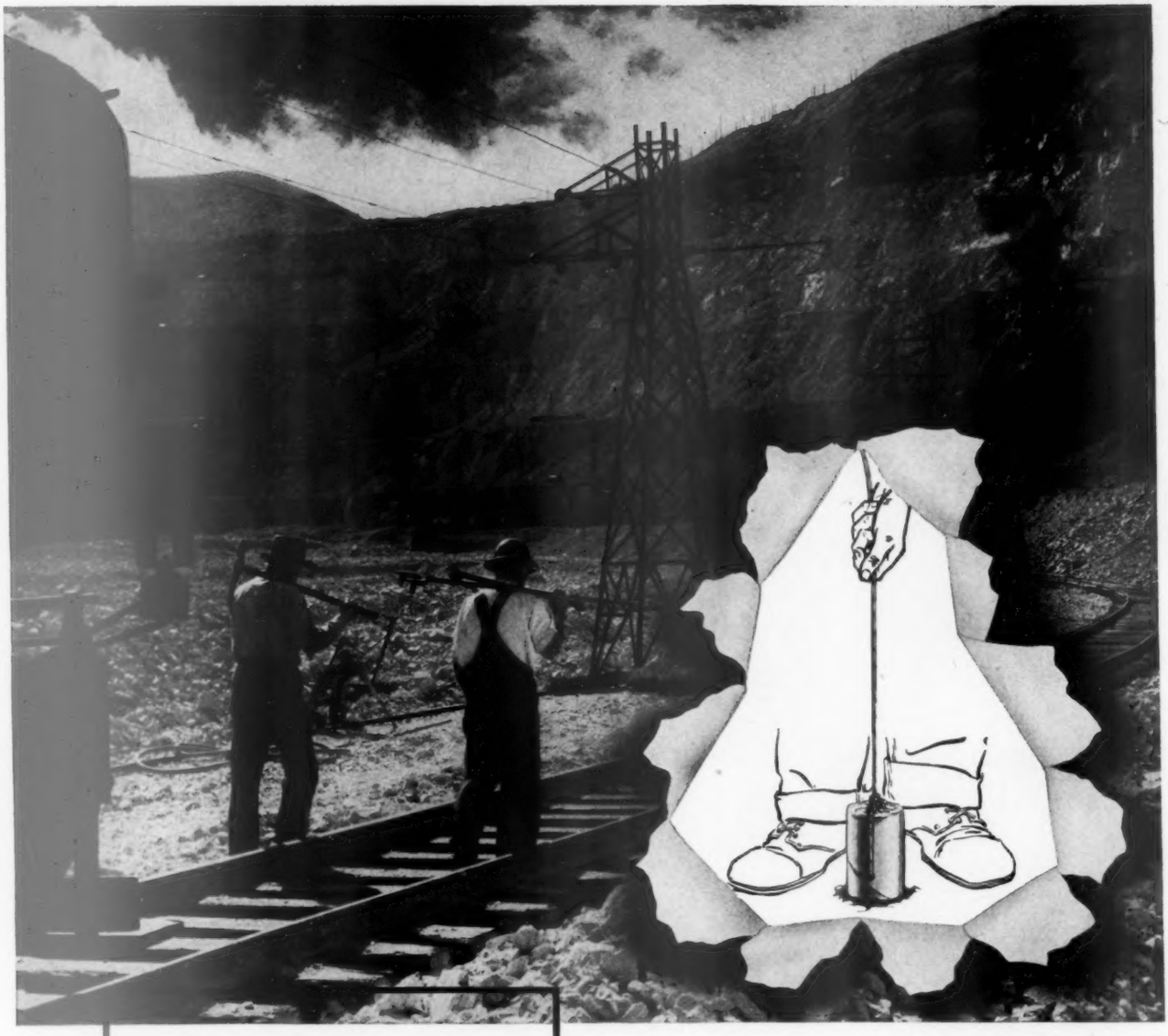


Primed cartridge– on its way to work

Greater force is centered around the primer cartridge. When Primacord is used, *every* cartridge is a primer cartridge! . . . because the Primacord, attached to the cartridge, at the bottom of the hole, is in contact with every cartridge in the load.

Insensitive to fire, friction and ordinary shock, Primacord must be *deliberately* detonated by fuse and cap or electric blasting cap. Once released, a powerful detonating wave travels at the rate of 3.85 miles a second! . . . exploding cartridges in every hole in the network practically instantaneously. Tremendous shattering force is created, resulting in better fragmentation, easier removal.

Primacord may be used on large blasting jobs and small. Try it on your next job.

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Manufacturers of Safety Fuse since 1836

PB-44

PRIMACORD-BICKFORD DETONATING FUSE

TOUGH AS A TIMBER WOLF..

tame as a puppy

Purple Strand Form-Set is the toughest, strongest wire rope in the commercial field . . . and yet it's not wild or hard to control.

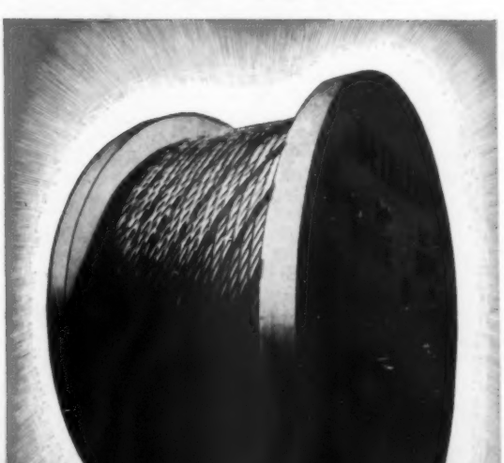
Reasons: the premium steel in this rope is preformed (each strand permanently set in the corkscrew pattern it will occupy in the finished rope). As a result, Form-Set rope is relaxed, easy to handle. It can be cut or spliced without seizing, spools easily, and has greater resistance to bending fatigue.

Right now wire rope is a key tool in war production. For efficiency—make it Purple Strand Form-Set.

PURPLE STRAND

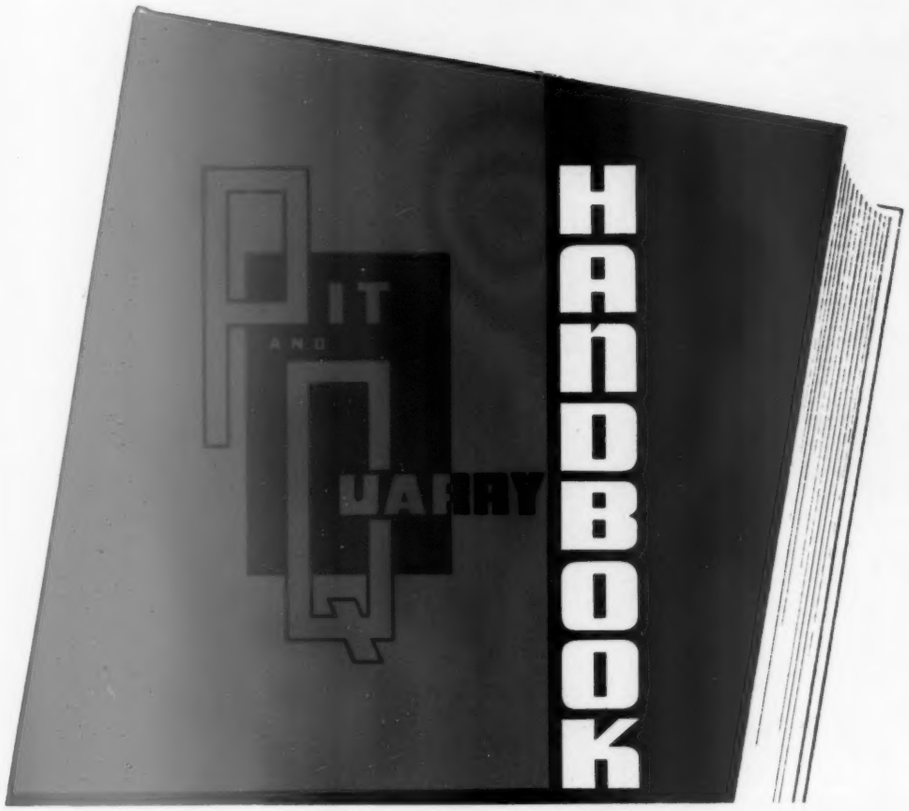
FORM-SET

WIRE ROPE



BETHLEHEM STEEL

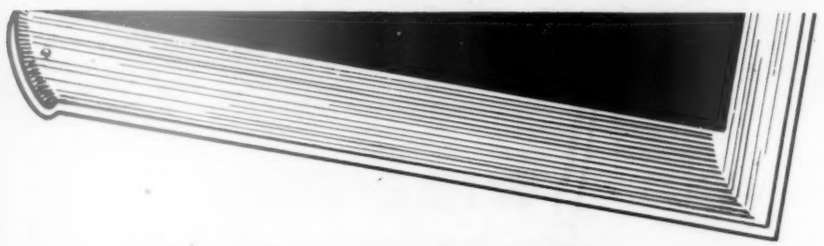
BETHLEHEM STEEL COMPANY



An Indispensable Tool For Both Operator and Supplier of Equipment

The pit-and-quarry industries, in providing important basic raw materials, bear a large responsibility for the success of America's war effort. For the operator, the revised Technical Section of the 1942 Handbook provides a ready answer for many of his operating problems. For the concern supplying him with the tools and machinery necessary to produce his materials, the 1942 Directory Section supplies an accurate, up-to-the-minute list of all known producers of nonmetallic minerals and their products. Each new listing has been carefully checked for accuracy. Previous listings have been revised and brought up to date. Inactive firms have been eliminated.

1942 Edition Now Available



Directory Section listings appear two ways —(1) alphabetical by companies, (2) geographical by plants. You get company names, officers, location of plants, size or capacity, and the names of the men who do the buying. Choose the complete Handbook and Directory . . . or the convenient, flexibly-bound Directory alone. Order NOW and get one of the first copies off the presses. Use the handy coupon below.

- 880 PAGES
- 33 CHAPTERS
- 15,000-NAME DIRECTORY
- COMPLETELY INDEXED
- AUTHORITATIVE

Pit and Quarry,
538 S. Clark St., Chicago, Ill.

Date.....

Please send.....copies of the 1942 HANDBOOK ($10.00 per copy)
Please send.....copies of the 1942 DIRECTORY ($10.00 per copy)

☐ Check enclosed.....
☐ Send Invoice with book

Name..... Title.....

Company.....

Town..... State.....

FRANK, WARTIME MESSAGE TO PIT AND QUARRY OPERATORS

Why It's Difficult to Get LeTourneau Earthmoving Equipment Now

Defend America—that was the 1941 national program. To keep pace, LeTourneau doubled production, delivered 85% to high-rated projects. Practically all of this and some more—95% of our output—was sold through regular LeTourneau-"Caterpillar" dealers for delivery to private users—pit and quarry operators, contractors and loggers—producing defense materials or bases. That was 1941.

By using LeTourneau Rooter to break up limestone rock and Bulldozer to shove it over pit bank for loading, The Williston Shell Rock Company makes fullest use of tractor horsepower on its Florida limestone property.

Deliveries to Speed Offensive

Today, we are at War, striving desperately to take the Offensive. Our Government has asked us to increase production. LeTourneau expects to build 50% more equipment in 1942 than ever before. Most of it will go directly into active combat service with the U. S. armed forces. The remainder will be used as the government directs, for night and day construction work and for getting out critical materials, on those projects most urgently needed for Offense and Victory.

A few of you will be able to get new equipment. To many, though, the Victory program means using for the duration the equipment you now have.

If, like hundreds of other successful pit and quarry outfits, you already have LeTourneau equipment—Carryall Scrapers, Dozers and Rooters—you're fortunate. That equipment was built stoutly for long life. Thanks to LeTourneau welded alloy steel construction it's easy to repair; can be economically reconditioned to practically new working efficiency.

Expert Service Available

No matter where you're located, your nearest LeTourneau-"Caterpillar" dealer carries a large stock of factory-made parts to serve you with a minimum of delay. He has expert, factory-trained servicemen ready to help you with your equipment maintenance and overhaul problems. Many LeTourneau dealers are equipped with portable welding outfits, to give you time and money-saving service right on the job. All have excellent shop facilities.

So to keep your equipment operating steadily, see your nearest LeTourneau-"Caterpillar" distributor.

BREAKING IN NEW TRACTOR OPERATORS?

Give them *The Co-Operator*—written by and for tractor operators, in the interests of making tractor power go farther through the proper care and use of LeTourneau stripping and materials-handling equipment. It's read regularly by over 20,000 operators, superintendents, foremen and mechanics who want to learn more about:

Equipment repair and maintenance • *Cable care, selection and operation* • *Care of tires* • *Lubrication* • *New earthmoving methods, etc.*

The Co-Operator is offered to you and your men absolutely free—10 fact-packed issues yearly. You can get as many copies as you need by writing *The Co-Operator*, R. G. LeTourneau, Inc., Peoria, Illinois. Send NOW.

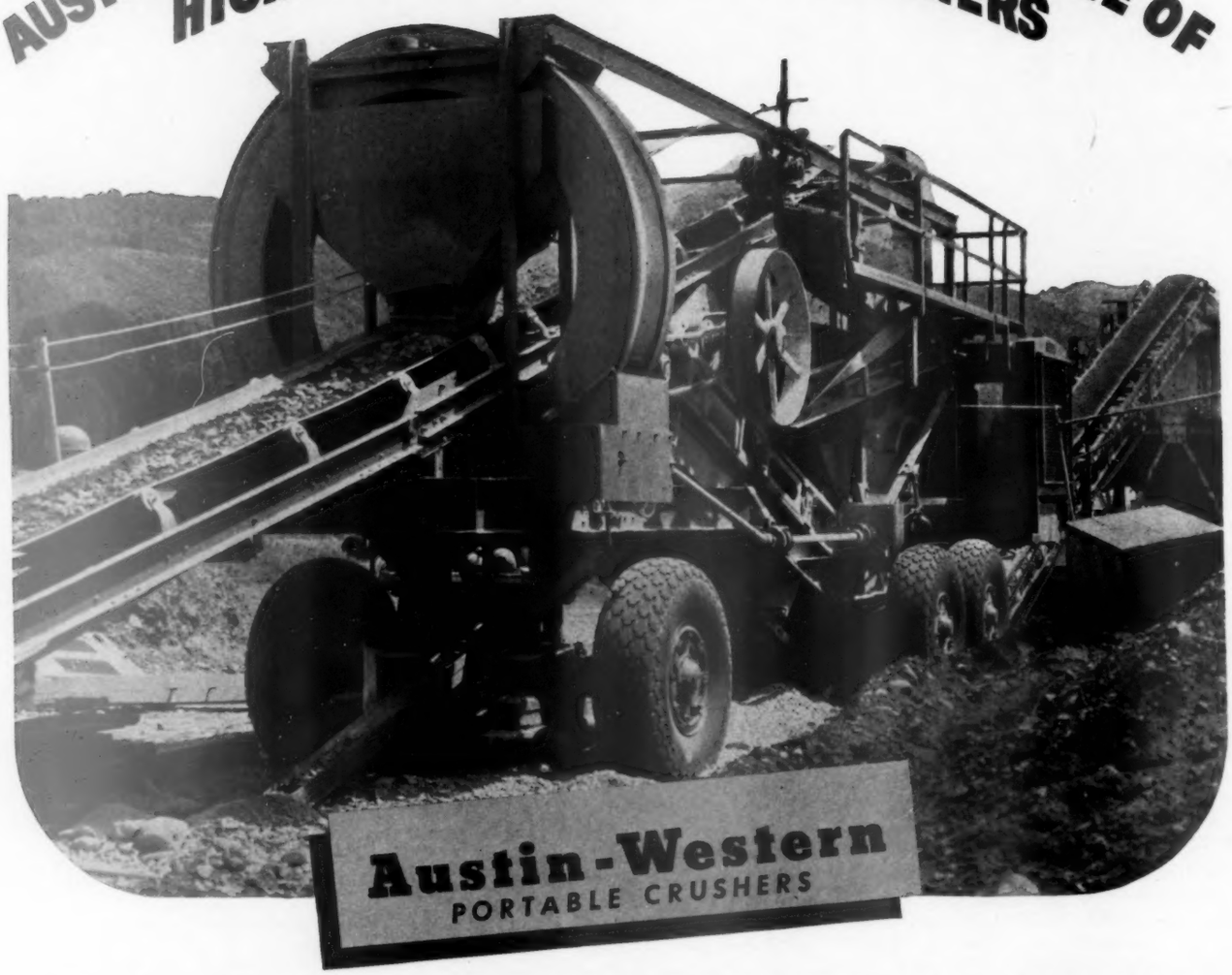
War is Won by Work—Not Words

CARRYALL, ROOTER STRIP S. AFRICAN GYPSUM PIT

Pretoria Portland Cement Co., Ltd., Gannavlakte, Cape Province, adopted this modern stripping method 3 years ago. The LeTourneau Scraper (below), an old 10-yard, is used with a "Caterpillar" D7 tractor to strip 4 to 12 feet of overburden from gypsum deposits. A LeTourneau Rooter breaks the hard-packed gypsum, which is later loaded and hauled to the screening plant by Scraper. Changeover from Scraper to Rooter on the LeTourneau Power Unit is quickly and easily made . . . enables Pretoria Portland Cement Company to do all these money-saving mining jobs with but one tractor. Long LeTourneau equipment life makes these savings possible now.

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA
Cable Address: "BOBLETORNO"
CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*. TOURNACRANE.
*NAME REG. U. S. PAT. OFF.

AUSTIN-WESTERN PRESENTS A NEW LINE OF HIGH-OUTPUT PORTABLE CRUSHERS



Tandem Units Consistently Produce 300 Tons Per Hour from Pits with 25% to 35% Oversize

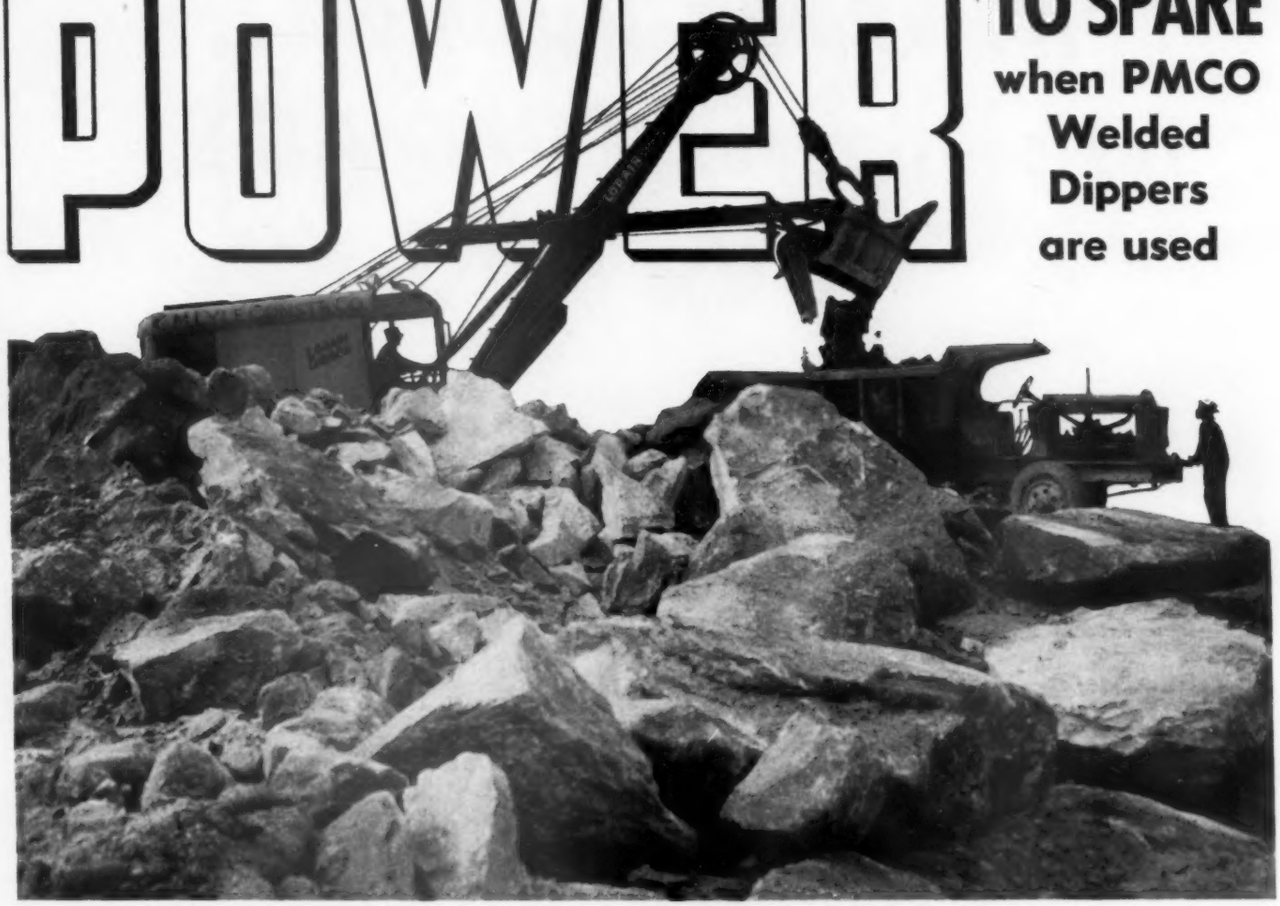
● These new high-efficiency units, which have proved their ability and durability under practical operating conditions, are engineered for efficient operation in tandem or separately. They embody all the time-tested features which have made A-W Portable Crushers outstanding for efficient, economical operation. An important new A-W development is the production-accelerating Rotary Elevator, which carries all over-size material back to the crusher without spillage, and with a capacity adequate for all requirements. Primary unit of tandem outfit is equipped with a 10"x36" jaw crusher. The unit, shown here in operation on a project of M. J. Ruddy & Son in Nevada, is equipped with a 40" x 22" roll crusher.

Before you expand or replace your present portable crusher equipment, get full facts about these new high-output A-W machines. An Austin-Western representative will give full co-operation in determining your exact requirements.

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois

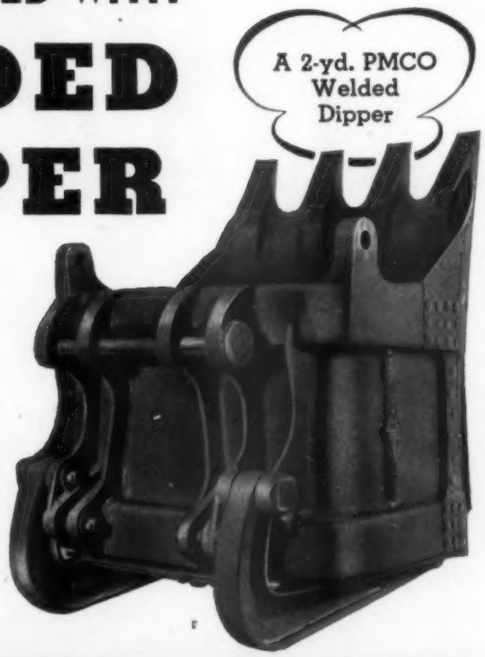
MOTOR GRADERS • BLADE GRADERS • ELEVATING GRADERS • SCRAPERS • CRUSHING AND SCREENING PLANTS • ROLLERS
ROLL-A-PLANES • MOTOR SWEEPERS • SHOVELS AND CRANES • SCARIFIERS • DUMP CARS • TRAIL CARS

POWER TO SPARE when PMCO Welded Dippers are used



A THEW-LORAIN SHOVEL EQUIPPED WITH PMCO WELDED DIPPER

working on rock digging in constructing the site for the General Supply Depot at Conley, Georgia



- Unhampered by excess weight, PMCO Welded Dippers allow full power of the shovel to be put to work.
- The tougher the job the more evident are the advantages of the PMCO WELDED DIPPER—Structural Strength—Correct Proportion of Weight—Flexibility of Design.

We operate the largest and most complete manganese steel foundry in the United States

PETTIBONE MULLIKEN CORPORATION

Established 1880

4710 West Division Street, Chicago, Illinois

It's Vitally Important...
for continuous TONNAGE
Use and Specify

QUAKER CONVEYOR BELTING

Industrial America must move faster than ever before. Continuous tonnage of Sand, Gravel, Stone, Cement, and kindred fields must move faster, F-A-S-T-E-R.

By equipping with Quaker Conveyor and Transmission Belting you have the answer in this part, to step up war production. Their ability to "do the job," absorb punishment and in many instances under conditions far from ideal, still giving extra long service. This is due to Quaker's farsighted and constant "engineering know-how" to fit the field requirements where they operate.

At Quaker every effort is being made to serve all—fairly and equitably lending every possible facility to National Victory . . . so if your Belting orders are a little late—you'll know U. S. A. has been given all right of way.

Industrial and Civilian users are being served to the best of our ability under the present situation.

Quaker is at your service, to help you conserve in every way and enable you to obtain maximum service as it has for over 55 years, thereby preventing waste of the Nation's most vital war material.

WHEN YOU NEED INFORMATION—SERVICE—HELP—LET US AID YOU

QUAKER RUBBER CORPORATION

OVER 55 YEARS CONSISTENT QUALITY

PHILADELPHIA

NEW YORK • BUFFALO • CHICAGO • MEMPHIS • HOUSTON • SAN FRANCISCO

. . . With Your Ideas on Ways to SPEED PRODUCTION *with* COMPRESSED AIR

Here's how you can contribute IDEAS to help win the war.

DO THIS: Describe some application of compressed air which speeds production (in your own experience or observation). The IDEA counts—not the grammar. Simple rules mailed on request.

YOUR OPPORTUNITY to pass along ideas which will speed up production and help win the war. Substantial cash prizes offered. Prize-winning papers will be brought to attention of your industry, giving recognition and prestige to the authors. All entries of value to the war effort, whether they are prize-winners or not, will be offered to the proper United States Agency with full credit to the writer.

PRIZES DOUBLED. Because of increased importance of compressed air in the war effort, prize awards as originally announced, have been doubled, and closing date has been extended to July 1, 1942.

ATTENTION EXECUTIVES. Posters announcing this IDEA Award Program are available to enable you to bring this project to the attention of your engineers and shop men. Free on request.

All requests for Rules and Posters should be addressed to Russell Gross, Educational Director, Compressed Air Institute, East Orange, New Jersey.

★ ★ ★ ★ ★ ★ ★ ★

$1000.00 IN CASH AWARDS

FIRST PRIZE $200.00 — THREE PRIZES OF $100.00

TEN PRIZES OF $50.00 — SPECIAL AWARDS $25.00 EACH

For every non-prize winning entry which is accepted for publication in a technical journal, at the request of the Compressed Air Institute.

plus

PERSONAL PRESTIGE and RECOGNITION

Uncle Sam Needs Your Ideas

HERE'S HOW YOU CAN HELP

Describe compressed air applications in your own experience or observation, which speed up production. The IDEA will be passed along to help the war effort. Write today for details.

This announcement appears here through the courtesy of

FULLER COMPANY • **Catasauqua, Pennsylvania** • *Member of:*

COMPRESSED AIR INSTITUTE..

90 WEST STREET — NEW YORK, N.Y.

MINING
Speed up the War Effort
with INCREASED PRODUCTION
Here are a few recent shipments of Symons Cone Crushers and Screens which will increase the output of important materials. In addition to the production of metals and industrial minerals, this equipment is producing the materials required for the construction of air bases, flying fields, cantonments, supply depots, docks and other facilities needed by our armed forces.
STONE
GRAVEL
SLAG
INDUSTRIAL MINERALS
CONTRACTING
NORDBERG MFG. CO. MILWAUKEE WISCONSIN
NEW YORK · LOS ANGELES · LONDON · TORONTO
SYMONS CONE CRUSHERS

Here's *Exactly* Why

The CONCAVE SIDE

Saves Belts-Saves Rubber-Saves Power!

Pick up any V-belt that has straight sides. Bend that V-belt while you grip its side-walls as in the picture above. You will feel the sides of the belt bulge out —as shown in Figure 1 on the right. Clearly, that out-bulge gives the belt a shape that does not fit its sheave groove.

Now look at Figure 2. There you see what happens when you bend a belt that is built with the patented Concave sides. You get a similar change in side-wall shape—but what a different result! The precisely engineered Concave side becomes perfectly straight. There is no out-bulge:—the full side-width of the belt *uniformly* grips the sheave groove wall. This means *uniform* wear—*longer* life—a saving in belts for you, a saving in rubber for the Nation. In addition, this full side-width grip on the pulley carries heavier loads without slippage—another saving of belts and a saving in power too!

Only belts built by Gates are built with the Concave side, a Gates patent.

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

Chicago, Ill. 549 West Washington
New York City 215-219 Fourth Avenue
Birmingham, Ala. 405 Liberty National Life Bldg.
Los Angeles, Cal. 2240 East Washington Blvd.
Denver, Colo. 999 South Broadway
Dallas, Tex. 2213 Grillin Street
Portland, Ore. 333 N. W. 5th Avenue
San Francisco, Cal. 2700 16th Street

Allis-Chalmers

THE NEW 4-WAY

FOR HIGHER SCREENING CAPACITY . . . LONGER CLOTH LIFE!

Longitudinal Tensioning Gives Flat Transverse Section . . . Uniform Bed Thickness! Deck Sections Are Interchangeable and Reversible — a New Feature That Cuts Replacements to a New Low!

If you're wasting high-grade steel with too frequent cloth replacements . . . if you're looking for increased capacity from the screens you buy . . . here's a new development that's making screening history — the new Allis-Chalmers 4-WAY Deck!

Because the cloth is tensioned lengthwise along the screen, you get an absolutely flat transverse section. The bed is distributed uniformly across the entire width. And the cascading action imparted to the material as it tumbles from one section to the next turns the bed upside down . . . decreases matting tendency of damp material.

That means you get increased screening efficiency . . . higher capacities for a given feed! And you can maintain uniformly good separation with higher rates of feed than were ever possible before!

For dewatering service, the new 4-WAY Deck is especially effective. Transverse buffer strips that support the cloth act as drip strips . . . prevent water from running down the screen.

Cloth Life Increased!

Best of all, this new deck is interchangeable and reversible *(see sketch)*. Screen cloth may be used safely until approximately 2/3 of its wire diameter is worn away. Then instead of throwing the deck away, you merely reverse the 4-WAY Deck and get an almost equal amount of wear in this position!

What's more, to offset the greater wear to which the feed end is subjected, the sections of the deck can be interchanged in a few minutes — a feature that will appreciably lengthen your cloth life.

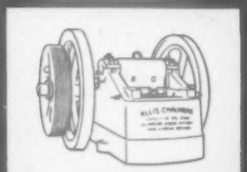
Call on Cooperative Engineering!

The new 4-WAY Deck represents another in the long list of advancements Allis-Chalmers Cooperative Engineering has contributed to the industry. Our unrivalled experience and facilities are at your complete disposal whenever you are faced with a production problem.

Why not take advantage of this service soon? It's available to you with no cost or obligation! Allis-Chalmers, Milwaukee, Wisconsin.

A 1518

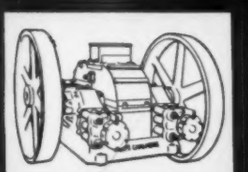
Get "All Out" production with ALLIS-CHALMERS



Jaw Crushers—Primary and Fine Reduction

Large Gyratory Crushers Up to 60 in.

Type "R" Crusher with "Speed-Set" Control

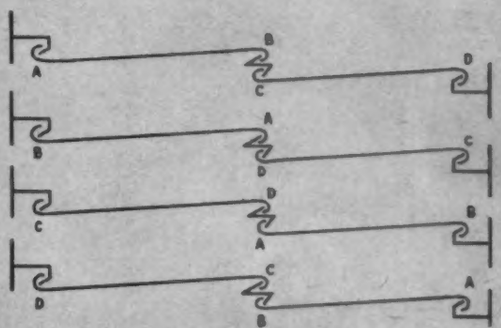


Crushing Rolls for Granular Products

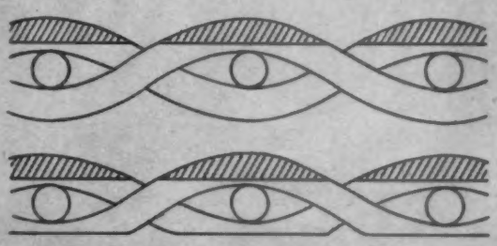
Pulverators (Multi-impact Hammer Mills)

Announces...

DECK



NEW 4-WAY DECK IS INTERCHANGEABLE and reversible. Note the four positions in which it can be used on a two-section unit. Where more than two sections are required, the intermediate sections are tensioned by an adjustable clamping bar controlled from the sides of the screen.



AFTER THE WIRE HAS BEEN WORN DOWN on one side, the 4-WAY Deck can be reversed . . . and almost double the wear obtained. By interchanging feed and discharge end sections, you can even get additional cloth life.

EQUIPPED WITH A THREE-SECTION 4-WAY DECK, THIS 5 FT BY 14 ft Allis-Chalmers Ripl-Flo has even greater performance possibilities. Each of the complete line of Allis-Chalmers vibrating screens can now be supplied with this new deck.

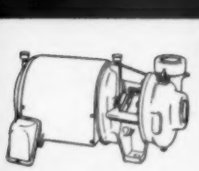
COOPERATIVE ENGINEERING

ALLIS-CHALMERS A-C MILWAUKEE

Low-cost, High-capacity Ripl-Flo Screen

Rotary Scrubber Screens—Complete Washing Units

Sand Washers—Materials Up to 1/2" Ring Size



Electrifugal Pump — Compact, Low-cost

Lo-Maintenance Motors, Texrope V-Belt Drives

We're Looking After Your Interests
And helping You to help Uncle Sam, too.

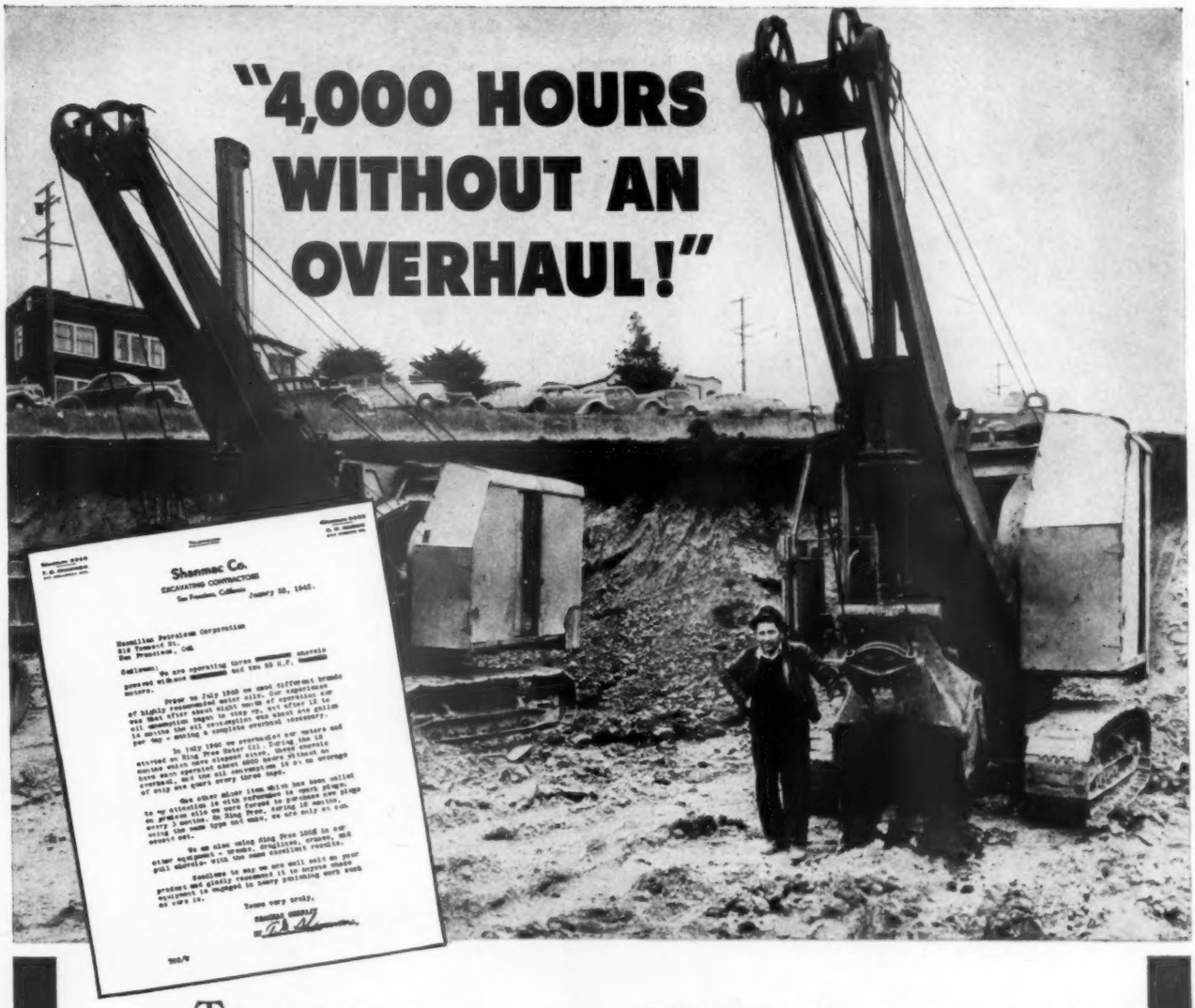
Distributors of Universal Crushing Equipment, all over the country, can be a big help to you at this time when equipment may not be easy to get. Their recommendations will help smooth out the rough road ahead. Too, they'll help you to get more from your present equipment and help you to keep it running. You need them—they need you; today and after the "duration."

There's a Universal Crusher and Road Maintenance Equipment Dealer near you to help you to *repair, renew and rebuild* your present equipment. Contact your nearest dealer—we'll put you in touch with him—get a Replacement Parts Bulletin—anticipate your needs.

Possibly an additional conveyor, crusher or screen will increase the output of your present plant. Maybe a rearrangement of present equipment will do the same. Universal dealers have always been long on service—now in the emergency they want more than ever to be of help. And we're back of them 100%.

UNIVERSAL CRUSHER CO.
619 C Ave. West, Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS



THE EXPERIENCE of the Shanmac Company, excavating contractors of San Francisco was that prior to July 1940 they used different brands of recommended motor oils.

But after about eight months of operation, their oil consumption began to step up. And after 12 to 14 months the oil consumption was about a gallon a day—making a complete overhaul necessary.

"In July 1940 we overhauled our motors and started on RING-FREE Motor Oil," writes T. G. Shannon.

"During the 18 months which have elapsed since, our shovels have each operated about 4,000 hours without an overhaul, and the oil consumption is on an average of only one quart every three days."

On other oils they had to purchase new spark plugs every three months. On RING-FREE, they are on only their second set after 18 months.

"We are using RING-FREE 100% in our other equipment—trucks, draglines, cranes, and pull shovels with the same excellent results. Needless to say we are well sold on your product and gladly recommend it to anyone whose equipment is engaged in heavy, punishing work."

RING-FREE is the only oil you need, as Mr. Shannon points out, for all the different kinds of equipment used by contractors.

What RING-FREE has done for others, it can do for you. Write us!

* * *

MACMILLAN PETROLEUM CORPORATION
50 West 50th Street, New York · 624 So. Michigan Avenue, Chicago · 530 West 6th Street, Los Angeles

MACMILLAN
RING-FREE
MOTOR OIL

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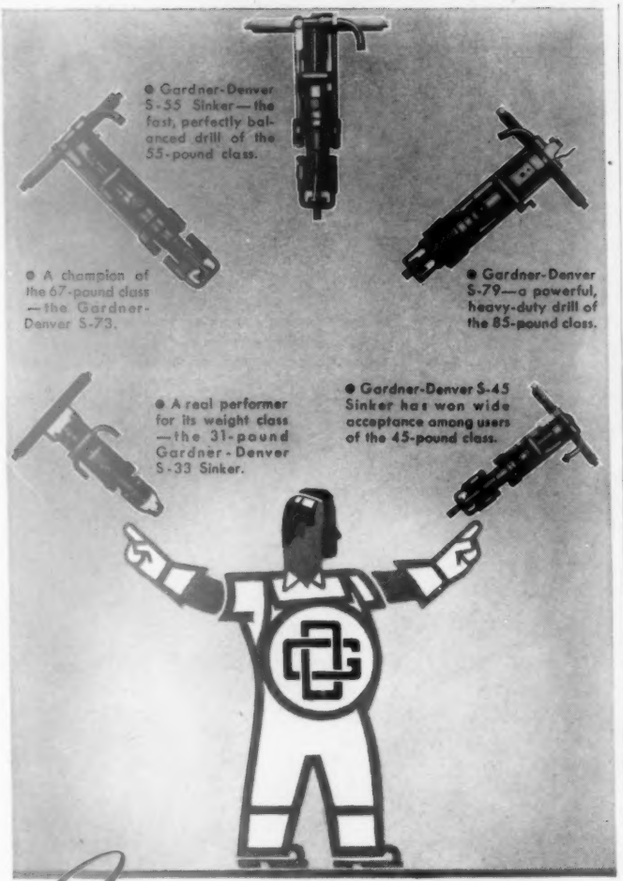
Macmillan Petroleum Corporation


● Gardner-Denver S-55 Sinker—the fast, perfectly balanced drill of the 55-pound class.
● A champion of the 67-pound class—the Gardner-Denver S-73.
● Gardner-Denver S-79—a powerful, heavy-duty drill of the 85-pound class.
● A real performer for its weight class—the 31-pound Gardner-Denver S-33 Sinker.
● Gardner-Denver S-45 Sinker has won wide acceptance among users of the 45-pound class.

Choose from the Champions

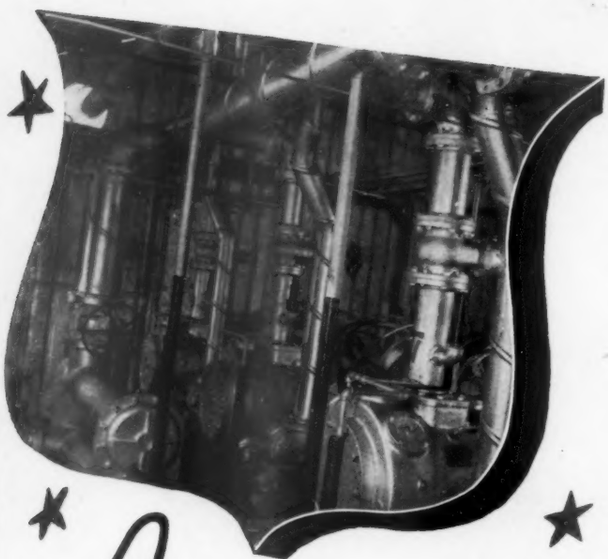
. . . FOR THE EXTRA FOOTAGE YOU NEED TODAY

FOR increased quarry output—and for the extra footage required during 1942—choose the sinkers that give *extra* performance. You'll find a better sinker of every weight class in the Gardner-Denver complete line. Properly engineered, precision built Gardner-Denver Sinking Drills for every purpose embody the proved refinements you want—and the speed, the power and dependability you must have. For the complete specifications, write Gardner-Denver Company, Quincy, Illinois.

A QUARRY OPERATOR WRITES, "Our equipment includes five Gardner-Denver Sinking Drills, together with a Gardner-Denver Wagon Drill and Air Compressor. Since installing the equipment, we have produced 225,000 yards of pay stone at a total maintenance cost of .0015c per yard."

GARDNER-DENVER PRODUCTS SPEED VICTORY

GARDNER-DENVER *Since 1859*



Are your ★ PIPE REPLACEMENTS *Helping Win the War?*

● **This is no time to waste vital steel. That's why pipe users everywhere are depending on Naylor Light-Weight Pipe for replacements.**

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ROLLED STEEL CONSTRUCTION
for GREATER STRENGTH and SPEED

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Marcy Ball, Rod and Tube Mills; Wilfley Tables; Density Controllers; Massco-Grigsby Pinch Valves — Laboratory Equipment and Chemicals — MINE AND MILL SUPPLIES

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EDW. J. NELL CO. *Manila, P. I.*
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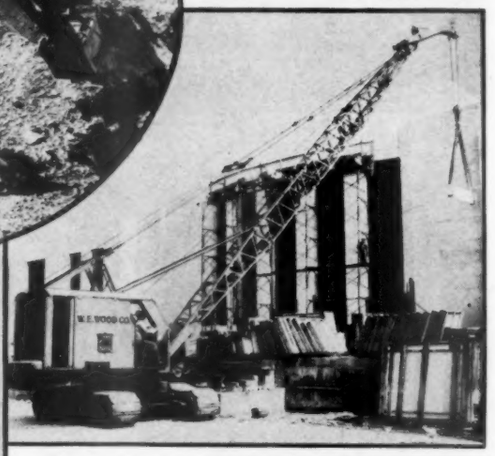
A POPULAR CHOICE FOR ALL CONSTRUCTION

—a page of job photos showing typical application of BAY CITY 3/4 yard shovel—10 ton crane



Photos show how these fast, powerful, easy operating machines are being adapted to many different construction uses. If you have had an opportunity to see them on today's biggest projects, you will readily recognize their *big machine value*. Their sturdy, heavy-duty construction has resulted in such a wide-spread demand, that our entire production is now limited to priority orders. We would, however, be glad to send you catalogs.

BAY CITY SHOVELS, Inc., Bay City, Michigan

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12 Sizes
3/8 to 1½ Yard
Also truck mounted shovels and cranes

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PIT AND QUARRY

Vol. 34 — MAY, 1942 — No. 11

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals. Copyrighted 1942 by Complete Service Publishing Co., 538 South Clark Street, Chicago, Ill.

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H. W. BAUMGARTNER
President

STANLEY A. PHILLIPS
Vice-President and Directing Editor

Field Editor:
W. E. TRAUFFER

Associate Editor:
HARRY F. UTLEY

Circulation Manager:
W. T. KLUSSMAN

●

Advertising Manager:
JAMES E. MONTGOMERY
Telephone HARrison 8548
Chicago, Ill.

Eastern Advertising Manager:
W. A. WILSON
Room 1235, 101 Park Ave.
Telephone CAledonia 5-4438
New York, N. Y.

Central Advertising Manager:
D. R. EGBERT
Auditorium Bldg.
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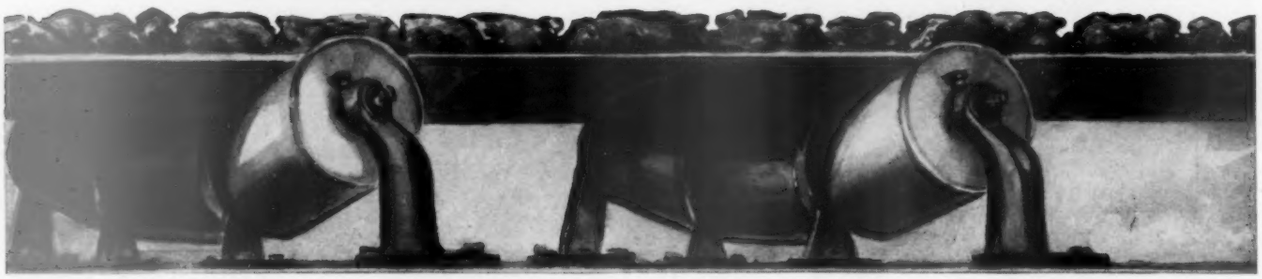
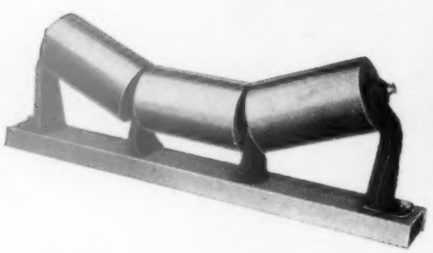
MEMBER AUDIT BUREAU OF CIRCULATIONS

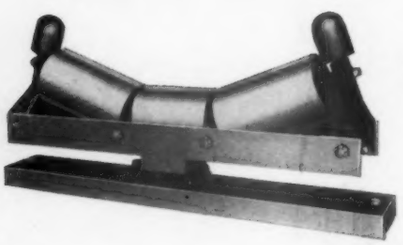
YOUR CONVEYOR BELT!



Keep it *Keep it* *Keep it*

GOING...STRAIGHT...CLEAN





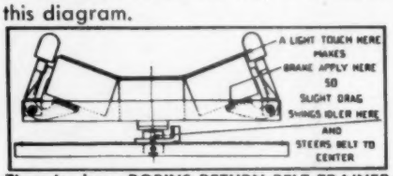
WHEN?—all the time there's work to do. Because you want to get your share of increasing 1941 business. **ROBINS ANTI-FRICTION TROUGHING AND RETURN IDLERS** are designed and constructed to outlast other idlers. They are widely known for the following high-grade features:

1. Rigid truss construction.
2. Complete identical pulley assemblies, interchangeable and reversible.
3. Improved "Single-Shot" lubrication.
4. "Triple Seal" that keeps grease in and dirt out.

You get maximum service and minimum maintenance with

WHY?—because belting is the most expensive item in a conveyor installation and its premature destruction is a serious, inexcusable waste.

ROBINS BELT TRAINERS are not "guide idlers." A belt controlled by **ROBINS** Trainers is aligned *without wear;* not by pressure on the edges but by rolling contact with the entire surface of the belt. Notice the way it works in this diagram.



There is also a ROBINS RETURN BELT TRAINER

HOW?—with ROBINS RUBBERDISC RETURN IDLERS. The rubber discs of these idlers are made of a soft abrasion-resisting rubber which slightly flattens at the points of contact with the belt. These deformations afford a constant automatic cleaning action for both discs and belt. Result—no accumulation of sticky abrasive or corrosive substance on the belt which means longer belt life and less maintenance. This Idler is equipped with ball bearings completely sealed and lubricated for life. No greasing or oiling is required.

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ROBINS
TRAINING IDLERS

ROBINS
Rubberdisc
RETURN IDLERS

ROBINS CONVEYING BELT COMPANY PASSAIC, NEW JERSEY

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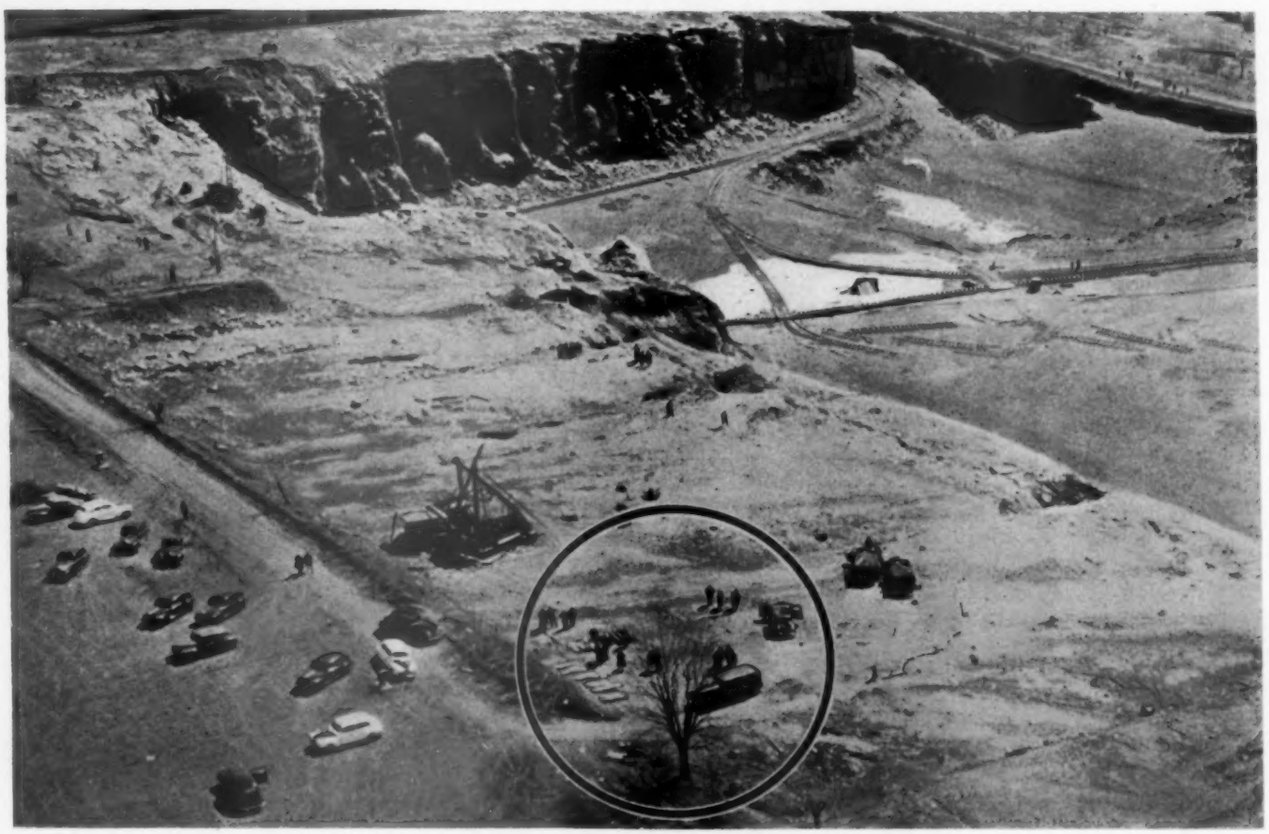
PIT AND QUARRY

CHICAGO MAY, 1942

PREMATURE QUARRY EXPLOSION KILLS 31



Circled in this air view of the Lehigh Portland Cement Company quarry four miles north of Easton, Pennsylvania, are some of the bodies of the 31 men killed there March 26 by a premature blast of thousands of pounds of dynamite.

Investigators Still Seek Real Clue to Sandts Eddy Blast

Twenty tons of dynamite, which exploded prematurely with an earth-rocking concussion at 9:17 o'clock on the morning of March 26, took the lives of 31 men in the limestone quarry of the Lehigh Portland Cement Company, Sandts Eddy, Pennsylvania, injured a dozen school children, broke windows and shook houses as far as 60 miles away, in one of the most violent explosive catastrophies in the history of the cement industry.

Only seven bodies could be identified. The remainder were torn to pieces by the violence of the blast, which came without warning while the men were enjoying a mid-morning lunch.

A truck from Belvidere, New Jersey, had unloaded the explosive early in the morning. The boxes had been opened, but fuses had not been attached when the men moved away to a field alongside the quarry for their brief snack.

The explosion caught them there, and not one escaped alive. Shattered bits of bodies were thrown over the field for 300 yards in every direction, a fact which made it virtually impossible to identify the majority of the dead.

Eighteen of the men were married and their deaths orphaned 63 children. Nine were single, and another was a widower. The other three victims were representatives of the Hercules Powder Company.

The victims and their ages were:

Benny Ascani, 40; Joseph Ascani, 39; Victor Garbich, 48; Lester Gruver, 27;

(Continued on page 35)

Locomotives Arranged in Push-Pull Order Speed Up Operation

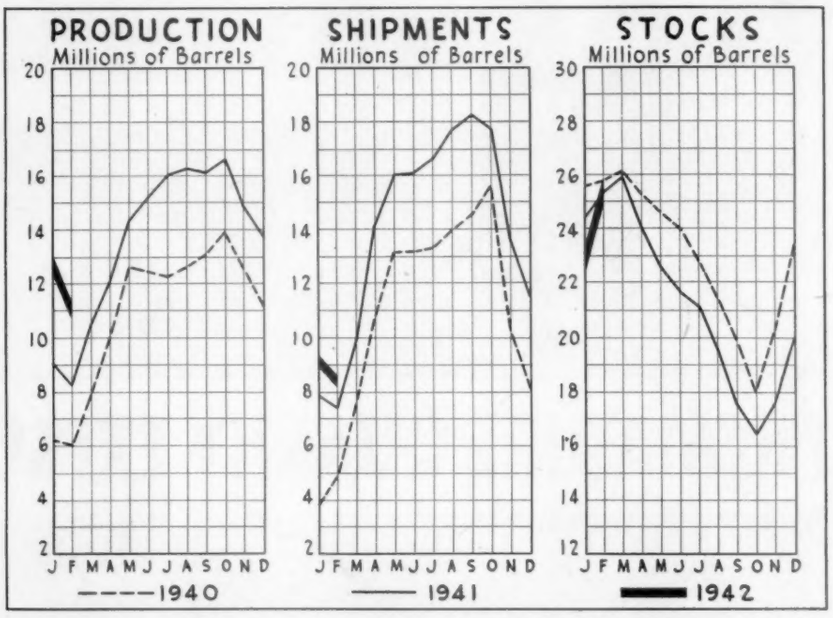
An out-of-the-ordinary method of using industrial locomotives that should offer advantages to other operators encountering similar conditions was evolved by the Griffith Company & Bent Company, construction contractors for the Friant Dam in California. Early in 1940 they acquired three General Electric standard industrial Diesel-electric locomotives of 43 tons and 300 horsepower each. Each locomotive was equipped with electro-pneumatic control and the other adjuncts required for multiple operation.

The gravel supply for the concrete-mixing plant at Friant Dam is on a river sand bar, about three miles south of the dam site. *(P&Q, May, 1941, pages 77-79.)* The original intention was to use two of the three locomotives in multiple for hauling a six-car gravel train back and forth from the river to the dam; the third was to be placed in general switching service.

Before full operation of the mixing plant was under way, however, Superintendent Harvey Slocum came up with the idea that, instead of operating the two locomotive units together at one end of the train, it would be a safer method to place a locomotive at each end of the train—more economical and much safer because the track parallels a highway and crosses it twice. By this arrangement the engineer was always at the front of his train and had full visibility of traffic conditions. Only one engineer was required, since multiconductor control cable was run along the side of the train to connect the two locomotives.

Because these early locomotives had 12-volt control, some trouble was at first experienced with a voltage drop through the cable. Installation of an auxiliary relay in each locomotive corrected this trouble.

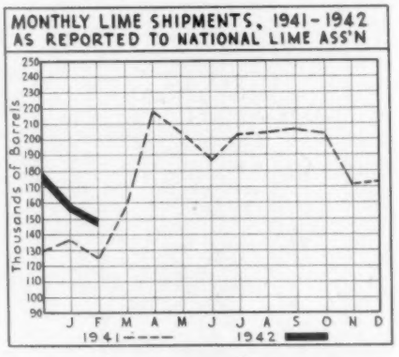
This method of multiple operation should offer advantages to other users who are performing the same type of back-and-forth bulk-material transfer, provided they can use two smaller locomotives rather than one larger one. If other similar units are required in other operations about the plant, the operator then has the great advantage of interchangeable locomotive units in case of failure on the part of one locomotive, or during servicing periods. Similarly, it is possible for the operator to use the units individually on other jobs as occasions arise.



The Portland-cement industry in February, 1942, produced 10,813,000 barrels, shipped 8,285,000 barrels from the mills, and had in stock at the end of the month 25,714,000 barrels of cement, according to the Bureau of Mines. Production and shipments in February, 1942, showed increases of 29.6 and 11.1 per cent. respectively, as compared with February, 1941. Portland-cement stocks at mills were 1.6 per cent. higher than a year ago.

EMPLOYMENT AND PAY-ROLLS
(Compiled for PIT AND QUARRY by Isador Lubin, Commissioner of Labor Statistics, U. S. Dept. of Labor.)

Industry	Establishments	Number of Employees	Pay-Rolls (1 week)
Cement:			
December, 1941....	134	23,808	$745,048
January, 1942.....	134	22,868	704,396
Percentage change		—3.9	—5.5
Quarrying and non-metallic mining:			
December, 1941....	835	28,938	776,891
January, 1942.....	835	26,480	666,384
Percentage change		—8.5	—14.2



According to data collected by the National Lime Association, 71 companies in February, 1942, shipped 146,676 tons of lime (103,764 quicklime; 42,912 hydrate). Reporting companies represent 47.4 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 375,000 tons. Shipments of lime by users for February, 1942, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	570	6,012
Building	12,192	17,034
Chemical	91,002	19,866
Total	103,764	42,912

Blasting-Cap Accidents Were Fewer Last Year

All users of explosives are being asked to coöperate in the movement to protect children from the dangers of playing with blasting caps. Although warnings against allowing these caps to fall into the hands of children are contained in each box of caps, records show that many of them are left lying carelessly about. Those who use explosives can make themselves the most important factor in the movement to save children from injuries and sometimes death by making sure that the caps are carefully stored away where boys and girls can not get them.

Accidents to children from playing with blasting caps decreased in 1941 as compared with 1940. The desire this year is to reduce these dangers as much as possible. This can be done if there is wholehearted coöperation.

Paid Circulation of Pit & Quarry Among Nonmetallic - Mineral Producers in Recent Years:

CONTINUOUSLY FOR 25 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

1941	(November)	6,179
	(May)	5,945
1940	(November)	5,397
	(May)	5,037
1939	(November)	4,641
	(May)	4,617
1938	(November)	4,496
	(May)	4,366
1937	(November)	3,971
	(May)	3,772
1936	(November)	3,654

69% increase in 5 Years

Predict Sharp Rise in Carloadings of Sand, Gravel, Stone

An increase of 17.2 per cent. in freight-car loadings of gravel, sand and stone during the second quarter of the current year over the corresponding 1941 period is forecast by estimates of the 13 regional Shippers' Advisory Boards as made public here April 3.

It is estimated that freight-car loadings of gravel, sand and stone will reach a total of 524,454 during this year's second quarter, compared with 447,625 actual carloadings in the same period a year ago.

Cement carloadings for the same period are expected to jump 4.0 per cent., from 185,945 to 193,385, while carloadings of brick and clay products are expected to increase 0.4 per cent., from 76,238 to 76,510, and an increase of 0.9 per cent. is indicated for carloadings of lime and plaster, from 50,481 to 50,927.

Take Applications for Research Fellowship

The University of Maryland, in cooperation with the National Sand and Gravel Association, offers a fellowship for research on appropriate problems related to the sand-and-gravel industry. Fellows enter upon their duties on July 1, and continue for 12 months, including one month for vacation. The fellowship amounts to $600 for the year and is paid in twelve monthly instalments. It is open to graduates in engineering, from an accredited college or university, who are qualified to undertake graduate study and research work leading to a master's degree. Applications will be received up to May 1, 1942, and forms may be secured by writing to the Dean of the Graduate School, University of Maryland, College Park, Maryland.

This Stanton Walker Fellowship was also granted for the years 1940-1941 and 1941-1942 and has worked out successfully. The holder of the first Fellowship appointment is Fred F. Bartel, a graduate of the University of Wisconsin in 1940. His research project is covered by the title, *Durability of Concrete as Affected by Aggregates*, a report of which is in preparation.

Coming Events

May 18-20, 1942—New York. Spring meeting, Portland Cement Association, Waldorf-Astoria Hotel.

May 26-28, 1942—Hot Springs, Virginia. Annual convention, National Lime Association, The Homestead.

June 4-5, 1942—Chicago. Annual convention, National Industrial Sand Association, Palmer House.

June 9-11, 1942 — Cleveland. Annual convention, National Concrete Burial Vault Association, Hotel Cleveland.

June 22-26, 1942 — Atlantic City. Annual convention, American Society for Testing Materials.

Blast (from page 33)

Charles Gumulak, 51; Michael Kochis, 54; John Kopach, 49; Charles Lilly, 52; William List, 43; August Marinelli, 28; Otto Miechur, 52; Ettor Plebani, 28; John Pulcini, 38; John Sikora, 41; Charles Smith, 56; Samuel Smith, 24; Stephen Talpos, 49; Arthur Zappasodi, 47; Alfred Bavaria, 22; Elwood E. Eberly, 23; Alfred Frankenfield, 20; Clayton Herman, 32; Franklin J. Krock, 19; Leon A. Miechur, 21; Leo Pace, 43; Quinto Pignotti, 21; Raymond Pulgini, 21; Andrew Kerlick, 51.

Other victims, representatives of the Hercules Powder Company were George B. Hadesty, Jr., 49; Allentown; William Lanahan, New York City and Ray E. Garnett of Rochester, New York.

Official investigation disclosed that three blasting holes at the brink of the pit had been loaded when the premature explosion occurred.

Investigators swarmed over the scene of the tragedy for days looking for the cause of the explosion, but it probably will never be known because all the witnesses are dead. On April 10, two weeks after the tragedy, Lewis G. Hines, secretary of labor and industry of Pennsylvania, issued a report that "old and unsafe" blasting caps probably were responsible.

Strangely enough none of the plant's main buildings, located comparatively near the quarry, were damaged. There are 200 persons employed there.

Sixteen other workmen had a miraculous escape from injury. They were busy at the bottom of the quarry. The dynamite which exploded was stacked at the top. It was only because of the freakish habits of exploding dynamite that the surviving men claimed to have escaped the fate of their fellow workers. They were showered with stones and some were knocked down by the concussion.

W. E. Carson, Long Prominent in Lime Field, Dies at 71

William E. Carson, 71, president and general manager of the Riverton Lime & Stone Company, Riverton, Virginia, which his father established, died March 25 at his home near Front Royal, Virginia.

Long prominent in the lime industry, Mr. Carson was a founder of the National Lime Association and served as its president from 1908 to 1920. He also served during the last war as chairman of the service committee on lime, which functioned under the War Industries Board.

In addition to his quarry-industry activities he was widely known for his work in the establishment of the Shenandoah National Park. He was chairman of the Virginia Conservation Commission from 1926 to 1934 and in that capacity directed the job of setting up the park which was dedicated by President Roosevelt at Big Meadows in July, 1936.

Active for many years as a Democrat, he headed the Seventh District committee between 1910 and 1940 and managed Harry Byrd's campaign for governor in 1925.

A native of Enniskillen, Ireland, he went to Virginia in childhood with his parents.

E. I. Williams, formerly vice-president, has been elevated to the presidency of the Riverton Company, succeeding the late Mr. Carson. He joined the company in 1932, was made sales manager in 1933 and was appointed vice-president last year. He is a native of South Carolina, attended Columbia University, and served the General Chemical Company and the Tennessee Copper Company before joining the Riverton concern.

W. E. Carson

E. I. Williams

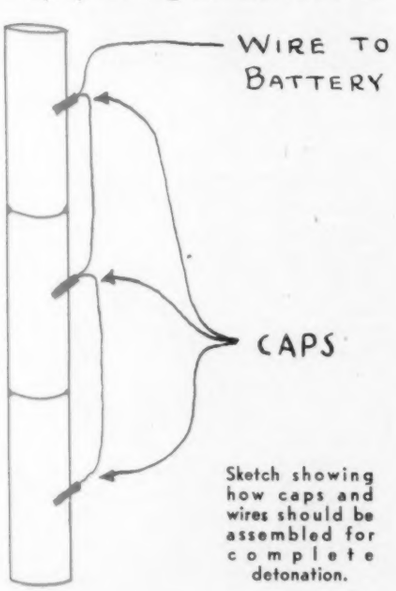
The Universal Concrete Pipe Company of Columbus, Ohio, has leased a five-acre tract at Henderson, Kentucky, where it will establish a temporary plant to manufacture pipes for a defense project in that area.

Correct Capping of Cartridges Improves Blasting Efficiency

When three or more cartridges of dynamite or other solidified explosives are loaded in bore holes of small diameter (3 inches or less), trouble is often encountered in getting complete detonation of the charge. This condition, known as partial detonation, is common in all types of rock blasting, and often reveals its nature by the presence of particles of unexploded materials blown out in the spoil. It is wasteful, gives unsatisfactory breakage, and is caused in more than 70 per cent. of the cases by the wrong placing of blasting caps.

An experienced blasting man is aware of the fact that the force of compression is speedier than the action of a detonating agent at the time and point of detonation. He should also be aware of the fact that, under a certain degree of compression, solidified materials will not explode. Since the common practice is to place blasting caps at, or near, the top of a column of explosives, their primary force is expended at that point, giving every opportunity for the central and lower sections of the column to compress. The smaller the diameter of the bore hole the more likely this is to occur, and if detonation does take place in the lower parts of the mass, the action is slow and irregular, as is often attested by the unusual quantity of smoke and fumes following the blast.

The partial-detonation problem may be solved almost completely by bringing the detonating agent into contact with all parts of the explosives column. This we accomplish very effectively by allowing the lead wire to extend in within a few inches of the base of the column, electric blasting caps of required size being spaced at intervals of 2 feet along the column face. This practice is followed in all types of small-diameter bore holes regardless of depth, and while it requires a few more blasting caps than the old-time method, the initial cost is amply taken care of by the saving in explosives, plus a far more effective and efficient blast.—*F. R. Cozzens.*



Sketch showing how caps and wires should be assembled for complete detonation.

March Building Awards Greatest Since 1927

The total construction contracts awarded in March in the 37 eastern states amounted to $610,799,000, according to F. W. Dodge Corporation. This is the highest March total recorded since 1927 and is almost $131,000,000, or 27 per cent., ahead of the corresponding month last year.

Indication of the progress of conversion of construction to war purposes is seen in the fact that 72 per cent. of the 1942 first-quarter dollar total was for public projects, as compared with 47 per cent. of the 1941 first-quarter total. In other words, public-construction contract volume in the first quarter of this year was nearly double the volume of the first quarter of last year, while dollar volume of private construction declined about one-third. The "freeze" order issued by the War Production Board on April 9 will speedily convert practically all construction activity to war purposes.

State-Owned Plant to Supply Army's Cement

A contract has been awarded the South Dakota state-owned cement plant at Rapid City for cement to be used in the construction of the army air base at Rapid City and in the new Black Hills Ordnance Depot at Provo.

The plant has never worked over 50 per cent. of its capacity, officials said, but this year will operate close to its full capacity. Instead of remaining shut down for the overhauling of equipment from about the first of the year to the middle of April, the plant started up about January 1 this year running three shifts on its one kiln.

Wisconsin Plant, Idle 3 Years, Again Open

The Central Lime & Cement Company's sand-and-gravel plant near Afton, Wisconsin, has been reopened after more than three years of idleness. Defense orders are responsible for the reopening of the pit, which will be employing more than 25 men shortly.

Vanishing Profits Force Edison Out of Cement Business

After more than four decades of operation the Edison Cement Corporation is going out of business because of unprofitable operations, it was revealed in a notice given April 17 to the 400 employees at the firm's plant near Phillipsburg, New Jersey.

Established in 1898 to 1899 by the late Thomas A. Edison, the plant had a capacity of 2,000,000 barrels annually and had been operating recently at about 1,500,000 barrels. To be operated at a profit, Colonel Arthur Walsh, executive vice-president said, a cement plant must have limestone and cement rock close at hand, but limestone for the Edison plant had to be hauled 12 miles.

No definite date for the closing of the plant was announced, but tapering off of production began immediately. Besides the distinction of having been the only operating cement plant in New Jersey, the plant was one of the oldest in the whole Lehigh Valley area. The plant comprises huge storage facilities and 51 buildings of all types and sizes.

Announcement of the Edison company's plans to quit the cement business attracted interest in political as well as business circles. In Trenton Governor Charles Edison, who is on leave as president of Thomas A. Edison, Inc., declined to comment on the closing of the cement plant, but associates pointed out it refuted charges by some of his political opponents that he had profited through state orders given to the company. Retiring State Highway Commissioner E. Donald Sterner had charged last year that sales of the Edison Cement Corporation for state construction projects rose sharply after Mr. Edison entered state politics. Governor Edison replied that sales of Edison products to the state had declined during that period.

Pacific Pumice Firm Erects Fourth Plant

Early construction of a $30,000 plant in Stockton, California, to process pumice from a deposit near Valley Springs has been announced by the Pacific Pumice Materials Company.

The plant will be the fourth in the company's chain, the others being situated at Fresno, Pittsburg and in Siskiyou County, California.

The company is reported to have developed special machinery for molding circular blocks of pumice that can be easily laid to replace lumber and steel in silos and bulk-storage bins.

Buffalo Operators Fight Proposal to Restrict Dredging

A bill in the New York Legislature which would give the State Conservation Department power to restrict the dredging of sand and gravel from Lake Erie is strongly opposed by gravel companies in Buffalo, which remove from 400,000 to 500,000 cubic yards a year. Operators declare that if the state curtails the amount of sand and gravel taken from the lake, it will block the flow of vital materials to war-time building in Buffalo, forcing contractors to bring supplies from distant points at greatly increased cost.

The measure has the support of organized sportsmen who contend dredging interferes with fish-spawning beds. There also have been complaints to a legislative committee that lake dredging has resulted in some deterioration of the sand beaches along the American shore.

Gravel companies say that, if dredging ceased, the cost of sand that meets state specifications would increase as much as 300 per cent. if it had to be brought long distances. "Concrete sand" taken from the lake sells at $1 a ton. Similar sand, brought from some point downstate, would have to sell at $1.50 to $2.50 a ton to meet the transportation costs, they explain.

President Ernest M. Hammond of the Gravel Products Corporation said there is scarcely three weeks' supply of gravel on hand and thousands of cubic yards will be needed for defense plants. "We pump our gravel a mile to three miles out in the lake," Mr. Hammond said, "in an area covering about 15 square miles, mapped for us by the United States Engineers' office. As a matter of fact, this helps to keep the channels open; if we didn't dredge, the government would have to do so.

"We have been pumping from the same locations for 16 or 18 years, and we find that every year these holes are filled up with new sand and gravel that have been washed in."

Mr. Hammond said the statements that fish-spawning beds are being destroyed is not true, and that it does not take into account the fact that fish spawn in shallow water.

He contended further that if the sportsmen would get after the fishermen "using the big nets" they would come closer to finding the reasons why fish are not as plentiful as they used to be.

As for sand beaches disappearing, Mr. Hammond said that sand taken by the dredging companies is not a "beach" sand at all, but a coarser product which does not find its way to the shore line.

The gravel companies pay New York State 3 cents a cubic yard for the material taken from the lake.

Within the last two years the state of Pennsylvania has prohibited New York state gravel companies from dredging off the Pennsylvania shoreline.

Asks Reconsideration in Freight-Rate Case

The National Industrial Sand Association has filed a petition for reconsideration of Ex Parte 148, Increased Railway Rates, 1942.

This action follows the Interstate Commerce Commission's denial of all applications for any suspension or postponement of the increased rates, which accordingly became effective March 18.

The Silica Sand Traffic Association is preparing for inclusion in the petition comparisons of value and other data on the bentonite, clay, and other products of mines which were specifically limited to a 3-per cent. increase. In addition to the argument drawn from facts in connection with the sand industry proper, an argument will be justified that a 6-per cent. increase is unreasonable on industrial sand in comparison with the products of mines above referred to.

Chicago Firm Reports Gain in 1941 Income

Production of agricultural limestone by the Dolese & Shepard Company of Chicago was considerably higher last year following the installation of a Pioneer roll-crusher, according to the annual report of the company. An auxiliary plant, erected near the main quarry plant at McCook, Illinois, also raised the output of stone sand and other fine products. The auxiliary plant reprocesses screenings obtained from the main plant.

The net profit of the company for the year 1941, after providing approximately $42,000 for depreciation, amounted to $29,431.18 as compared with $14,947.66 in the year 1940. During the year two dividends of $1.00 per share were paid on outstanding capital stock, representing a cash disbursement of $36,496.00. The remainder of earned surplus account at December 31, 1941, amounted to $41,720.61, subject to the restriction of $41,400.00, representing the cost of treasury stock. The board of directors by resolution have proposed to the stockholders that the company retire and cancel its 900 shares of treasury stock, which action, if approved, would improve the dividend outlook.

All Construction Not Part of War Effort Forbidden by WPB

Non-essential construction came to a dead halt on April 9 when the War Production Board issued a sweeping edict which forbids building to be started except in a few specified cases.

Equally binding upon property owners, builders and suppliers, the order prohibits not only the starting of construction in most categories but also the withdrawal from inventory, and the purchase, sale or delivery, of any material for use in such construction unless expressly authorized by the WPB.

The order, which had been expected for some time by the building industry, goes far beyond the policy laid down last October by the old Supply Priorities and Allocations Board, and which has remained in effect ever since. At that time, priority assistance was merely denied to non-essential building. If materials could be obtained without government aid, construction could be undertaken.

The new edict, Conservation Order L-41 (full details on page 40), specifically provides that no residential construction except maintenance and repair work may be started without permission if the estimated cost is $500 or more. Similarly, no new agricultural construction may be launched if the estimated cost is $1,000 or more. No other construction, including commercial, industrial, recreational, institutional, highway, roadway, sub-surface and utilities construction — whether publicly or privately financed—may be initiated if the costs involved amount to $5,000 or more.

The order applies only to building not yet started, but projects under construction are to be examined individually by WPB. If it is found that scarce materials to be used in such projects can be put to more effective use elsewhere, work will be ordered to halt.

Field facilities of the Federal Housing Administration will be utilized to administer the order.

NISA Will Convene in Chicago June 4-5

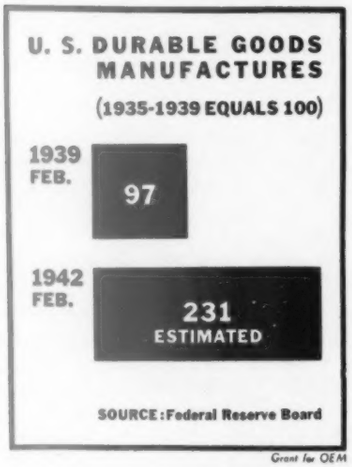
Due to situations growing out of the war emergency, the board of directors of the National Industrial Sand Association has reconsidered its decision to hold the 1942 convention at The Homestead, Hot Springs, Virginia.

Member companies are now advised that the 1942 convention will be held at the Palmer House, Chicago, on June 4 and 5, 1942. Program details will be announced later.

CURRENT BUSINESS INDICATORS

During the past month orders have been issued that virtually assure the suspension of consumers' durable-goods production for the duration of the war. Two of these orders are particularly significant. The first is the construction order which, with unimportant exceptions, prohibits all new non-essential construction. The other outlaws the use of metals for a broad variety of items for civilian consumption. This order is expected to result in the complete shutdown of the small metal-fabricating industries within the next sixty days unless their facilities can be utilized in the war effort.

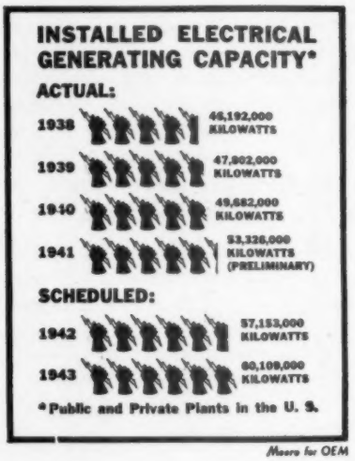
Taken together these orders spell a period of difficult adjustment for the nation. There is, however, a tendency to overemphasize the dislocations that will result from the decisions that are currently being made in Washington.



Grant for OEM

Despite the severe limitations that are placed upon construction by the new order, the War Production Board predicts that the largest building program of the nation's history will be carried out by the construction industry this year. Total construction for the year will reach $14,750,000,000 approximately one-fourth above the 1941 total of $11,500,000,000. Similarly, it is difficult to believe that a substantial part of the light metal-fabricating industry can not be converted to war production. Nevertheless, the next two or three months undoubtedly will be a period of painful readjustment for many segments of industry.

Industrial activity during March and the first half of April continued to follow the upward trend that has been in evidence since the attack on Pearl Harbor. Although the Federal Reserve Board's indexes for the month are not yet available, it appears reasonably certain that the seasonally-adjusted index for January will show a gain of at least one point. This would bring the index for the month to approximately 174 per cent. of the 1935-39 average. This increase reflects the accelerated rate of production in all phases of the war effort. These gains have more than offset the steady shrinkage in civilian-goods output.



Moore for OEM

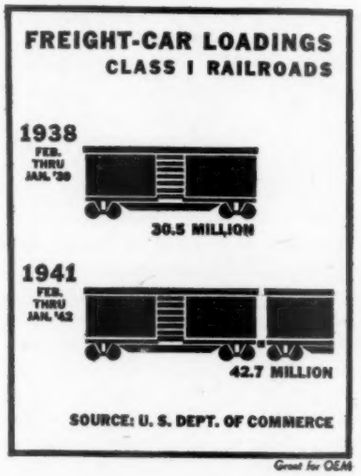
March steel production, according to the American Iron and Steel Institute, shattered all previous records. The total output for the month amounted to 7,392,911 net tons, an increase of 150,000 tons over the previous "peak" production of 7,236,068 tons in October, 1941, and 260,000 tons higher than in the corresponding month of last year. The March output brings the total steel production for the first quarter of the year to 21,038,889 tons, approximately 4 per cent. above the output in the same period of last year. If this rate is continued, the total production for 1942 will probably be somewhat higher than expected.

All classes of construction activity—heavy engineering, non-residential, and residential—advanced sharply in March. According to the F. W. Dodge Corporation, the total value of construction awards in the more important industrial states amounted to $610,799,000. Compared with the previous month, this represents a gain of approximately 40 per cent. and is 27 per cent. above the awards in the same month of 1941. During the first quarter of this year construction for war purposes accounted for 72 per cent. of the total awards.

The rise in industrial production is reflected in employment. From February to March employment increased by 1,800,000 persons, bringing the total employment to 50,400,000. During the same period, however, 1,400,000 persons entered the labor market. As a result, the net decrease in unemployment was 400,000.

Preliminary figures for March indicate that the total expenditures for war purposes exceeded $3,000,000,000. Of this total, more than $2,500,000,000 represent munitions and war construction as distinct from pay and subsistence. Consequently, the country is now producing war goods at a rate of not less than $30,000,000,000 a year.

Prices have continued to advance during the past month. From an average of 96.7 in February, the Bureau of Labor Statistics composite index of wholesale commodity prices rose to 97.6 per cent. of the 1926 average in March. Still further gains were registered during the first half of April. As a result of this steady increase in prices, it is



Grant for OEM

now reasonably certain that the Administration is convinced that we are in the initial stages of a serious inflationary spiral and has decided to attempt to freeze prices, wages, and rents at somewhere near prevailing levels. The broad principles of the price-control plan have already been drafted and are now waiting final approval.

Another important step in "total mobilization for war" was announced on April 19, when Federal Security Administrator McNutt was named chief of a new commission with authority to effectuate full man-power utilization. Although the executive order creating the new agency does not provide arbitrary power to move men from industrial or agricultural regions to another, there is evidence that the Administration may soon ask for complete power to draft labor.

EDITORIAL

Saboteurs in Industry

WHILE we hear much about *sabotage* on the part of individuals, little appears in the press about organizations that are hampering the production of vital war materials. Those publications which are commonly called newspapers feel themselves duty-bound to report all the cases of individual *sabotage* that come to their notice, but appear to be under no similar compulsion, moral or otherwise, to record those even more important cases that are due to groups which stand to gain financially from their obstructionist tactics. Individuals are commonly weak and defenceless, and, therefore, not likely to cause trouble, even when unjustly accused; whereas organizations, particularly business organizations, have access to means that are not available to the individual and are, on that account, to be feared and often to be left unmentioned, even when guilty.

If the individual happens to be a worker, his activities and crimes are certain to be given wide publicity as evidence of the lack of patriotism on the part of labor and of the need for "labor legislation" restricting the right to organize, picket or strike. As he has no economic weapon by which he can retaliate, he receives all the abuse and condemnation that should rightfully be heaped upon him.

If the organization guilty of sabotage happens to be of the "operating-for-profit" variety, the charges made against it, even the penalties imposed after guilt has been proved, are likely to go unnamed or, commonly at the worst, its misdeeds will be recorded in small type placed in some inconspicuous place where they are almost certain to go unnoticed. Even though such an organization may not possess the economic weapon of advertising patronage, either actual or expected, the mere fact that it is a member of the "fraternity of business" will insure in most cases that it will be treated kindly, gently and with forbearance and that its crimes will be viewed with "friendly understanding."

It should be recorded that violations of government regulations by business organizations have been increasing, not only because those regulations have been growing in number and complexity, but chiefly because the new rules are restricting the free play of free enterprise. The orders of the War Production Board, for example, have greatly widened the scope of government activity in the control of business enterprise and have seriously curtailed the profit-making opportunities of business men. They set up barriers against the exercise of the individualistic habits developed through long years of business dealings; they have stepped in between the buyer and the seller with sweeping prohibitions and crippling limitations. In many cases they have taken, or threaten to take, the profit out of the profit motive. They have aroused the fears, antagonism and enmity of thousands of business men, many of whom have been led by their strong emotional reaction into willful violation of rules created and enforced in the public interest.

It is because of this overpowering sense of rebellion that the Compliance Branch of the War Production Board has already been forced to issue suspension orders against a large number of business concerns and to warn many hundreds of others. Of 3,500 firms investigated, more than 1,800 were found to have violated the rules, most of them because of misunderstanding, but many of them because of deliberate intent. Those in the latter class and those against whom suspension orders have been issued range from companies with million-dollar ratings to small partnerships, from manufacturers of vacuum cleaners and washing machines to makers of silk hosiery and cotton linters. Every one of those who have been penalized was guilty of diverting to private civilian use such materials as silk, aluminum, copper, cotton, and the like, which are vitally necessary to the manufacture of parachutes, planes, explosives and other war materiel. Others were guilty of withholding information about their inventories; one willfully neglected to declare its ownership of 3,000,000 pounds of copper so as not to interfere with its profitable manufacture of slide fasteners. Another misapplied nearly 500,000 pounds of aluminum in direct violation of WPB orders. Another obtained priority preference on vital materials by falsely representing that the houses it was building were intended for defense workers. Others used raw silk needed for parachutes in the making of silk hosiery by fraudulently obtaining releases from WPB by misrepresentation. Dozens of other violations of similar seriousness could be cited to illustrate the selfishness of some business men in placing their private financial gain above the defense of the nation.

THESE crimes against America indicate not only a desire to profit at the expense of national security but an ignorance of end-results that is shocking among men who are usually credited with having exceptionally good sense and practical judgment. There are still too many persons who do not yet realize that this nation is exerting every effort it can muster to preserve its liberties and to insure its very existence, who do not understand that those liberties provide the conditions that make their ordinary profit-taking enterprises possible, that the laws enacted under our liberal constitution give the utmost protection to private property and private enterprise, that government, when it has not been the active champion and protector of business, has at least stood aside in an attitude of "benevolent neutrality."

These unscrupulous men are more dangerous to America than any ordinary criminal, for their misdeeds are not directed against a single individual, a single corporation, or a single group, but against the people of the United States. They are enemies of consumers and labor; they are traitors to their own group, the thousands of law-abiding American business men upon whom they unjustly bring undiscriminating public contempt and hatred. They must be taught that the life of this nation is not something to be trifled with, that the patience of the American people is not to be tried to the breaking point. Under the provisions of the Second War Powers Bill such violators will be subject to criminal prosecution, jail terms and heavy fines. Only by such methods can some men be made to understand that this war is a serious business and that America means to win it.

Cloth Bags.—Specific maximum prices for all types of second-hand cloth bags, determined by the general market levels which prevailed during the October 1 to October 15, 1941, period, were announced March 25 by Acting Price Administrator John E. Hamm.

Technically, the new ceilings become Maximum Price Regulation No. 55 which amends and replaces Revised Price Schedule No. 55. The maximum prices are established upon the basis of two descriptive factors: The size of the container and the weight of the material of which the bag is composed.

Under the previous schedule, now being replaced, each seller's maximum prices were frozen at his individual highest prices on sales or deliveries during the October 1 to 15 period. These prices varied considerably from seller to seller depending upon the circumstances peculiar to each individual sale.

Bags are divided into two major price classifications under the regulation which became effective March 30, 1942. The first, processed bags, includes containers which have been cleaned, mended and patched and are ready for immediate re-use as a container. The second, unprocessed bags, consists of those which, since last being used, have not been reconditioned so as to be ready for immediate re-use.

"Unmendable" bags are definitely brought under price regulation for the first time by inclusion within the unprocessed classification. These unmendable bags are those which are torn or damaged so that they can not be reconditioned for use as a container but which are of sound material and can be satisfactorily used for wrapping purposes or can be made into smaller sized containers. The regulation does not cover "junk" or "waste" bagging which has deteriorated so that the material is not further usable for wrapping or as a container.

Second-hand bags include those composed of burlap, jute, sisal, istle, cotton cloth, gunny cloth or other textile material which has been used once or more to package any product, or for any other commercial purpose.

Typical of the prices established by the Regulation are the following:

Size	Weight of Material	Maximum Prices Processed	Unprocessed
Burlap Bags:			
24-in. by 36-in.	8 oz.	$ .115	$ .085
33-in. by 44-in.	8 oz.	.190	.160
24-in. by 36-in.	10 oz.	.148	.118
33-in. by 44-in.	10 oz.	.248	.218
Cotton Bags:			
19-in. by 36-in.	3.75 yd.	.100	.070
27-in. by 39-in.	3.75 yd.	.150	.120
19-in. by 36-in.	3.00 yd.	.120	.090
21-in. by 36-in.	3.00 yd.	.130	.100
22-in. by 39-in.	2.50 yd.	.160	.130
24-in. by 39-in.	2.50 yd.	.170	.140
20-in. by 36-in.	2.00 yd.	.146	.116
28-in. by 39-in.	2.00 yd.	.225	.195

Restrictions are placed for the first time under the regulation, on the maximum amount which may be required as a deposit for lending or leasing bags. This deposit charge is limited to the maximum price for an unprocessed bag of the same size, type and weight. The provision was added because of a growing tendency for sellers of packaged commodities to induce purchasers to return the bag directly to the suppliers by lending or leasing the containers and requiring a deposit thereon which, in many cases, was several times larger than the seller's permissible maximum price for sales of bags of the same type.

All sellers of second-hand bags come under the terms of the regulation. These include dealers, emptiers, peddlers and individual sellers.

Premiums in addition to the maximum prices applicable in ordinary sales may be charged on an export sale only to the extent that such export sale involves additional costs on the part of the seller. Second-hand bags are now covered by a comprehensive export schedule issued by the Board of Economic Warfare.

Any person who buys processed bags and resells them directly to persons who are going to use them to package some product may charge a premium of 5 per cent. above the maximum prices established and may also add the actual freight incurred by him in bringing the bags to his plant. This premium may be charged only on the first 1,000 bags in any one sale.

Contracts entered into by sellers of second-hand bags prior to the effective date of the regulation, under the terms of and at prices in compliance with Revised Price Schedule No. 55, may be carried out at the contract price.

Construction Limited. — The War Production Board on April 9 called a halt to non-essential construction.

Effective immediately, Conservation Order L-41 prohibits the start of unauthorized construction projects which use material and construction equipment needed in the war effort. It also places all new publicly- and privately-financed construction under rigid control, except for certain strictly limited categories.

The action was taken by the WPB because the war requirements of the United States have created a shortage of materials for war production and construction. It is in the national interest, the board stated, that all construction which is not essential, directly or indirectly, to the successful prosecution of the war, and which involves the use of labor, material or equipment urgently needed in the war effort, be deferred for the duration of the emergency.

Many of the same materials, such as iron, steel and copper, are used by both essential and non-essential construction, and the same materials are largely used for war production. Since there is not enough of these materials for both war production and for less essential use, the order, in effect, allocates these materials away from unnecessary construction, and into ships, planes, tanks, guns, defense housing and other essential production.

This step goes much further than the SPAB policy announcement of October 9, 1941. In that announcement, it was made clear that no priority assistance would be given to non-essential construction. In the April 9 order, however, it is provided that no construction may be started (except in a few specified cases) without permission.

Equally binding upon property owners, builders and suppliers, the order prohibits not only the start of construction in most categories, but also the withdrawal from inventory and the purchase, sale or delivery of any material for use in such construction unless expressly authorized by the War Production Board.

The order specifically provides that no residential construction except for maintenance and repair work may be started without permission if its estimated cost is $500 or more. Similarly, no new agricultural construction may be started if the estimated cost is $1,000 or more for the particular building or project involved. No other construction, including commercial, industrial, recreational, institutional, highway, roadway, sub-surface and utilities construction, whether publicly- or privately-financed, may be initiated without permission if the cost of the project amounts to $5,000 or more.

In computing such costs the amount spent on the project within 12 months of the date of beginning construction, and subsequent to April 7, 1942, is included.

Specific types of construction, however, are necessarily exempt from the provisions of the order. These include:

1. Projects which will be the property of the Army, Navy, Coast Guard, Maritime Commission and certain other listed agencies of the Federal Government.
2. Projects to reconstruct or restore residential property damaged or destroyed on or after January 1, 1942, by fire, flood, tornado, earthquake or the public enemy.
3. Projects of the type restricted or controlled by provisions of the orders of the M-68 series, which cover the production and distribution of petroleum.

It was emphasized, however, that the order does not affect ordinary maintenance and repair work to return a structure to sound working condition without a change of design.

Officials charged with the administration of the L-41 order are considering a plan to issue to authorized projects an emblem or insignia to be conspicuosuly posted on the job to show that the construction has been approved by the War Production Board.

Although the order applies only to construction not yet commenced, projects already under construction are being carefully examined by the War Production Board on an individual basis. Such projects may be stopped if the scarce materials to be used in them can be put to more effective use in the war program.

Where priority assistance is granted by the War Production Board, authority to commence construction will be issued by the Director of Industry Operations on appropriate forms of orders in the P series.

These include preference rating orders of the P-14 series, P-19 series, P-41, P-46, P-55, P-98, P-110 and P-115. (See attached Schedule A for types of construction). Preference ratings extended on PD-1 or PD-1A forms or by any other P order than those listed in the L-41 order do not constitute authorization to begin construction.

Facilities of the Federal Housing Administration have been made available to the War Production Board in the administration of this order and applications for authority to start construction will be filed with the local offices of the Federal Housing Administration on Forms PD-200 and PD-200A, copies of which may be obtained at any of the district War Production Board offices or at any local office of the Federal Housing Administration. The public is urged to file only emergency applications during the next month, as it is anticipated that authorization will be given only for emergency projects. Authority to begin construction will be granted only when the design and specifications conform with the standards established for the minimum use of critical materials, and no materials will be used on the project that do

not conform with the conditions of the authorization granted to begin construction.

On the basis of criteria established by the Director of Industry Operations of the War Production Board the local officers of the Federal Housing Administration will decide whether or not the project is eligible for recommendation to the War Production Board. If the project is deemed eligible, the application will be forwarded by the Federal Housing Administration to the administrator of the order for final consideration.

If the application is denied by the local Federal Housing Administration office, based on the WPB criteria, provision is made for an appeal to an appeals board to consist of the administrator of the order, a representative of labor and a third member who will represent the end product branch of the War Production Board within whose jurisdiction the class of project or construction would fall.

SCHEDULE A
CONSERVATION ORDER L-41

The following Preference Rating Orders and Certificates are listed pursuant to paragraph (b)(7)(i) of the above order. A general description of the type of construction covered by each, the appropriate application form and where such form should be filed, are given solely for purposes of identification.

Preference Rating Order	*Type of Construction*	*Application Forms*	*Where Filed*
P-14-a P-14-b	Shipyards and shipways	No form	Maritime Commission Washington, D. C.
P-19	Buildings, structures and projects important to the war effort and essential civilian needs, other than housing	No further application accepted under P-19 and P-19-a. Apply for P-19-h or P-19-i	
P-19-d P-19-g	Publicly-financed housing	Application is made only by the federal agency principally interested in the construction	
P-19-e	Public roads	Application is made by or through the Public Roads Administration of PWA	
P-19-h P-19-i	Buildings, structures and projects important to the war effort and essential civilian needs other than housing	Forms PD-200 and PD-200A	With the field office of FHA having jurisdiction over the location of the site
P-41	Construction of air-transport facilities	See Order	
P-46	Certain types of utilities Construction	See Order	
P-55 P-55 amended	Privately-financed defense housing	Form PD-105	With the field office of FHA having jurisdiction over location of the site
P-98	Construction related to petroleum enterprises as defined and limited therein.	See Orders in M-68 series	
P-110	Remodeling of housing in defense areas	Form PD-406	With field office of FHA having jurisdiction over the location of the site
P-115	Expansion of canning plants	Form PD-285	With WPB, Washington
Certificates			
PD-3 PD-3A	Principally buildings, structures and projects owned or to be owned by the Army, Navy or certain other governmental agencies	Form PD-3A	With the contracting or procurement official having jurisdiction over the contract

Mining Machinery.—The War Production Board has granted an A-1-a rating to manufacturers of mining machinery operating under Order P-56-a. This rating is to be assigned to specified percentages of the manufacturers' requirements as listed by them and submitted on Form PD-25-A in connection with the order, and will be in effect during the second calendar quarter ending June 30, 1942. The effect of the action will be to insure deliveries of specified quantities of materials to the hundred-odd makers of mining and smelting machinery operating under the order, and will provide a steady flow of equipment and repairs to the essential mine and smelting operations providing minerals vital to the war effort.

Manufacturers' requirements for raw, semi-fabricated and fabricated materials totaling about $50,000,000 for the quarter were approved by the Requirements Committee. This represents approximately 30 per cent. of the total for the year. J. S. Knowlson, Director of Industry Operations, has implemented the Requirements Committee action by providing for the use of the high ratings for materials.

Control of the ratings will be in the hands of the Mining Branch. Mining-machinery manufacturers affected by the action must report to the branch each Monday all orders they have placed through the previous Saturday. Amounts of each of the 81 items purchased will be entered against the quota for that particular company and further purchases must cease when the quota is reached. Likewise, the total quota for the industry for any particular item may not be exceeded. The plan outlined constitutes a form of allocation, since it provides a rating sufficiently high to assure delivery of the materials which the War Production Board wants the industry to have.

The order follows:

REQUIREMENTS COMMITTEES DETERMINATION
No. 20
(Meeting of April 3, 1942)

Subject: *Allocations to Manufacturers of Mining Machinery.*

I. It is determined that:

A. All mines producing essential metals and minerals operate at the capacity required by the war-munitions program.

B. In order for these mines to operate at this required capacity 30 per cent. of the quantities of materials, semi-fabricated and fabricated products shown in the table appended to this determination shall be allocated for delivery during the second quarter of 1942 to manufacturers of mining machinery holding serial numbers under order P-56A.

II. It is recommended that:

The Mining Branch determine the distribution of materials among the manufacturers of mining machinery.

W. L. Batt, Chairman
Requirements Committee

P-56-a had been amended March 2 to read as follows:

WAR PRODUCTION BOARD
DIVISION OF INDUSTRY OPERATIONS
PREFERENCE RATING ORDER NO. P-56-a
(as amended to March 2, 1942)
MATERIAL ENTERING INTO THE PRODUCTION OF MINING MACHINERY AND EQUIPMENT

To:
Name of Producer:
Address:
Serial No. Date:

Preference Rating Order. For the purpose of facilitating the acquisition of certain material in the public interest and to promote the national defense, a preference rating is hereby assigned to deliveries to the above-named producer and to deliveries to his suppliers, upon the following terms:

(a) *Definitions*

(1) "Producer" means the specific person to whom this order is addressed above.

(2) "Supplier" means any person with whom a contract or purchase order has been placed for delivery of material to the producer or to another supplier.

(3) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(b) *Assignment of Preference Rating*

Preference ratings of such grades as will be hereafter specified from time to time by the Director of Industry Operations on Form PD-25A, or on supplementary authorizations, are hereby assigned:

(1) to deliveries to the producer by his suppliers of those quantities and kinds of material which may be specifically authorized for rating by the director of Industry Operations from time to time on said form, and which will enter into machinery and equipment or repair parts for delivery to an operator as defined in Preference Rating Order P-56.

(2) to deliveries to any supplier of material which will ultimately be delivered by him or another supplier to the producer under the ratings assigned above, or will be physically incorporated into material which will be so delivered; or which will be used, within the limitations of paragraph (d) (2) hereof, to replace in such supplier's inventory material so delivered.

(c) *Persons Entitled to Apply Preference Rating*

The preference rating hereby assigned may, in the manner and to the extent hereby authorized, be applied by:

(1) the producer;

(2) any supplier of material to the delivery of which the preference rating has been applied as provided in paragraph (6).

(d) *Restrictions on Use of Rating*

(1) *Restrictions on Producer.*

(i) The producer may apply a rating assigned by this order only to these quantities and kinds of material specifically authorized for such rating by the Director of Industry Operations as indicated on the copy of Form PD-25A returned to the producer, or on such supplementary authorizations as may from time to time be issued to him by the Director of Industry Operations, and only to purchase orders and contracts placed by him prior to the termination of the period specified on said form, or said supplementary authorization.

(ii) The producer may not apply a rating to obtain delivery of material on earlier dates than required to enable him to maintain his production schedules.

(2) *Restrictions on Supplier.*

(i) No supplier may apply a rating to obtain material in greater quantities or on earlier dates than required to enable him to make on schedule a delivery rated hereunder or, within the limitations of (ii) and (iii) below, to replace in his inventory material so delivered. He shall not be deemed to require such material if he can make his rated delivery and still retain a practicable working minimum inventory thereof; and

if, in making such delivery, he reduces his inventory below such minimum he may apply the rating only to the extent necessary to restore his inventory to such minimum.

(ii) A supplier who supplies material which he has in whole or in part manufactured, processed, assembled or otherwise physically changed may not apply a rating to restore his inventory to a practicable working minimum unless he applies the rating before completing the rated delivery which reduces his inventory below such minimum.

(iii) A supplier who supplies material which he has not in whole or in part manufactured, processed, assembled or otherwise physically changed may defer applications of a rating hereunder to purchase orders or contracts for such material to be placed by him until he can place a purchase order or contract for the minimum quantity procurable on his customary terms; provided, that he shall not defer the application of any rating for more than three months after he becomes entitled to apply it.

(e) *Application of Preference Rating*

(1) The producer or any supplier, in order to apply a preference rating assigned hereunder to deliveries to him, must

(i) furnish one copy of Preference Rating Order No. P-56-a, with the attached form of acceptance thereof unsigned, to each of his suppliers with whom he places a contract or purchase order for material to the delivery of which he elects to apply a preference rating. After one such copy, regardless of serial number, has been furnished to a particular supplier, no additional copy need be furnished to that supplier to cover any subsequent application of a preference rating assigned hereunder; and

(ii) endorse on each purchase order or contract which is covered by a rating assigned hereunder, a statement in the following form manually signed by an official duly authorized for such purpose, specifying the rating assigned and appropriate serial number or numbers:

"Preference Rating A- is applied hereto under Preference Rating Order No. P-56-a, Serial No. (s) ....., with the terms of which Order the undersigned is familiar.

.....
(Name of Producer or Supplier)

By .....
(Duly Authorized Official)

Such endorsement shall constitute a representation to the War Production Board and the supplier with whom the purchase order or contract is placed that such purchase order or contract is duly rated in accordance herewith. Such supplier shall be entitled to rely on such representation, unless he knows or has reason to believe it to be false. Any such purchase order or contract shall be restricted to material the delivery of which is rated in accordance herewith.

(2) A supplier who has received from two or more producers or suppliers endorsed purchase orders or contracts for material to the delivery of which the same rating has been applied in accordance with this order, may (within the limitations of paragraph (d) hereof) include in a single purchase order or contract any or all of the material which he in turn requires to make such rated deliveries, but must specify in the endorsement on such single purchase order or contract all of the serial numbers contained in the purchase orders or contracts which have been so received by him and to fill which he is applying the preference rating.

(3) In addition to the foregoing requirements, a supplier (but not a producer), before he first applies the preference rating assigned hereunder to deliveries to him, must accept Preference Rating Order No. P-56-a by executing the form of acceptance attached at the end hereof, and file it with the War Production Board. No additional acceptance need be filed for any subsequent application of Preference Rating Order No. P-56-a, regardless of the serial number under which or of the name of the producer to whom it is issued.

(f) *Restrictions on Deliveries by Producer*

Material obtained by the producer on a preference rating assigned pursuant to this order shall be delivered by the producer only to an operator as defined in Preference Rating Order P-56 for use in accordance with the provisions and restrictions of said order.

(g) *Records*

In addition to the records required to be kept under Priorities Regulation No. 1, the producer, and each supplier placing or receiving any purchase order or contract rated hereunder, shall each retain, for a period of two years, for inspection by representatives of the War Production Board, endorsed copies of all such purchase orders or contracts, whether accepted or rejected, segregated from all other purchase orders or contracts or filed in such manner that they can be readily segregated for such inspection.

(h) *Reports*

The producer, and each supplier who applies a preference rating assigned hereunder, shall file such reports as may be required from time to time by the War Production Board.

(i) *Communications to War Production Board*

Acceptances of this order, all reports required to be filled hereunder, and all communications concerning this order, shall, unless otherwise directed, be addressed to:

"War Production Board,
Washington, D. C. Ref: P-56-a."

(j) *Violations*

Any person who wilfully violates any provision of this order or who by any act or omission falsifies records to be kept or information to be furnished pursuant to this Order may be prohibited from receiving further deliveries of any material subject to allocation, and such further action may be taken as is deemed appropriate, including a recommendation for prosecution under Section 35 (A) of the Criminal Code (18 U.S.C. 80).

(k) *Revocation or Amendment*

This order may be revoked or amended at any time as to the producer or any supplier. In the event of revocation, deliveries already rated pursuant to this order shall be completed in accordance with said rating, unless the rating has been specifically revoked with respect thereto. No additional applications of the rating to any other deliveries shall thereafter be made by the producer or supplier affected by such revocation.

(l) *Applicability of Priorities Regulation No. 1*

This order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1, as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this order shall govern.

(m) *Effective Date*

This order shall take effect on the date specified in the heading hereof, and shall continue in effect until July 1, 1942.

Issued this 2nd day of March, 1942.

J. S. KNOWLSON
Director of Industry Operations

SUPPLIER'S ACCEPTANCE OF PREFERENCE RATING ORDER No. P-56-a MATERIAL ENTERING INTO THE PRODUCTION OF MINING MACHINERY AND EQUIPMENT.

(Before signing this acceptance, read carefully the terms of the foregoing Order).

To: War Production Board
Washington, D. C. Ref. P-56-a

The undersigned has received a purchase order or contract containing an endorsement in the form provided in Preference Rating Order No. P-56-a. For the purpose of applying to deliveries to the undersigned the rating assigned by said order, the undersigned hereby accepts said order and agrees to be bound by the terms and conditions thereof.

Dated this 2nd day of March, 1942.

.....
Legal Name of Supplier

By .....
Signature of Duly Authorized Official — Title

.....
Address of Supplier

(Section 35(A) of the criminal Code (18 U.S.C. 80) makes it a criminal offense to make a false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.)

Multi-wall Paper Bags.—Suggested maximum prices for used multi-wall paper bags, or paper shipping sacks, aimed to encourage conservation of kraft paper and to relieve the pressure of the demand on burlap bags, were made public April 1 by John E. Hamm, Acting Price Administrator. Investigation by the OPA has shown that the demand for multi-wall paper bags may increase to 60,000,000 this year, or about 20,000,000 more than were used last year.

Manufacturers and dealers reported to OPA that many shippers, confronted with a burlap-bag scarcity, are using the paper bags for the first time and are not aware that the bags, when properly opened, can be sold to a dealer for re-use, in which case a substantial reduction of the original cost of the bags is effected.

Prior to the war only a few dealers were engaged in trading the second-hand shipping sacks but the burlap shortage has caused many dealers to seek additional revenue from the purchase and resale of paper sacks.

Both dealers and manufacturers, in preliminary discussions with OPA, have expressed satisfaction with the suggested prices for dumpers or users and dealers. These prices are presented in the following table:

TABLE OF RECOMMENDED MAXIMUM PRICES FOR RECLAIMED 100-POUND MULTIWALL PAPER BAGS

	Four-Ply Bags		Five-Ply Bags	
	Plain Each	Printed Each	Plain Each	Printed Each
A. Price paid to dumper by dealer	$.030	$.0225	$.0375	$.030
B. Price paid to dealer by user	.050	.0425	.0575	.050

Above prices are for carload-lot transactions. Recommended l.c.l prices may be determined as follows: (1) Deduct 10 per cent. from price paid by dealer to dumper. (2) Add 10 per cent. to price paid to dealer by user. Bags will be bought by dealer f.o.b. source and sold by dealer f.o.b. destination or "full freight allowed basis."

In general, bags used for packing of food ingredients or products may be re-used for packing a non-food product. Thus bags which are received primarily by baking concerns, confectioners, bottlers, canners and preservers, can be re-used to ship fertilizers, sand, lime, coal, kindling, sawdust, aluminum shot, plumbing

supplies, and sewage and garbage for rendering plants.

Manufacturers have estimated that 75 per cent. of the 1942 production of new paper shipping sacks can be re-used if the dumpers instruct their workers in the proper methods of handling the bags. Educational matter in the handling of the bags has been made available to the dealers and the users by the manufacturers and by the Paper Shipping Sack Manufacturers' Association, 370 Lexington Avenue, New York.

Further price action in this field may be taken by OPA in the future if it is found to be necessary.

P-56 Application Form.—When P-56 was revised, effective March 2, 1942 (PIT AND QUARRY, April, 1942, pp. 30-33), it became necessary to change the form theretofore used in applying for preference ratings where blanket ratings will not move the necessary equipment and supplies. All producers who hold mine serial numbers under P-56 have blanket A-8 and A-10 ratings subject to the familiar restrictions in the order. Furthermore, producing companies meeting the test in (c)(1)(ii) of P-56 may use a limited blanket A-1-c quota on a quarterly basis. The cases of those companies which do not qualify under (c)(1)(ii) and which have applied for consideration pursuant to the exchange of letters by Dr. Nelson and Mr. Hansen, are still under consideration.

Whenever the blanket ratings are inadequate, it is necessary to submit an application to the Mining Branch for authority to use such higher rating as the supplier demands. After consultation with the Mining Branch, it has been agreed that the form shown at the right, if used in submitting applications, will facilitate appropriate action.

The handling of applications will be expedited if this form is used. Use a typewriter wherever possible. The reverse side of the form should be used for answering question No. 9. A separate application should be made for each purchase order. Where the procurement of a single item involves several purchase orders on one or more suppliers, the applications may be grouped and submitted at the same time.

Producers have the legal obligation common to all industry of not applying for any higher preference rating than is necessary to move the materials needed. As to any given purchase order, if the producer's blanket rating is inadequate, he should ascertain from two or three suppliers what rating is needed, in order to be sure that when his application is submitted to the Mining Branch, he is not asking for a higher preference rating than he is prepared to justify. Many suppliers seem to be demanding A-1-a and A-1-b ratings in cases where such high ratings are not necessary. The dilution of the high ratings must be guarded against by not asking for them except under the compulsion of outright necessity.

The Mining Branch is engaged in revising PD-119, the monthly report form.

Producers should address all communications on priority matters to the Mining Branch, War Production Board, attention of E. W. Bauman, First Floor, Wing One, Temporary Building E, Sixth and Adams Drive, S. W., Washington, D. C. Each day the War Production Board receives many thousands of communications, which it has the difficult job of classifying. If letters on priority matters are addressed to the Mining Branch and to the attention of Mr. Bauman, delays of several days may be avoided.

When P-56 was revised on March 2, it tightened up controls on the use of critical materials and marked a continuation of the shift to direct allocation of these materials to individual companies upon a showing of importance either to prosecution of the War or to essential civilian activities. Producers must be prepared for even tighter controls. It is known that the board is inclined to view P orders as permitting the diversion of critical materials to non-essential uses. This is in conflict with the national policy of effecting the widest possible utilization of existing equipment and of authorizing the procurement of equipment and supplies only where an intimate relationship to prosecution of the war or to essential civilian activities can be shown.

These considerations should be kept in mind when producers use the form shown below. They must support their applications for high preference ratings with complete and convincing evidence. The industry is engaged in meeting direct military and essential civilian requirements. In the ordinary case producers should be able to support their applications for preference ratings for repair and maintenance parts and operating supplies, but the requirement for an adequate showing is much stronger whenever they ask for capital equipment either for replacement or expansion purposes.

OUTLINE OF INFORMATION REQUESTED TO SUPPORT REQUESTS FOR PRIORITY RATINGS UNDER P-56

Address all communications to: Mining Branch, War Production Board, First Floor, Wing One, Temporary Building E, Sixth St. & Adams Drive, S. W., Washington, D. C.
Attention: E. W. Bauman, Technical Advisor, Non-Metallics

PLANT INFORMATION

1. Company .....
(Name and address)
2. Mine ..... Mine Serial No. .....
(Name and location)
3. Type of product .....
(Coal, crushed stone, sand and gravel, etc.)
4. Total annual production in tons for 1941 ..... Present Daily Tonnage .....
5. Where new equipment is involved, show resulting contemplated daily increase in tonnage, if any .....
6. (a) No. of men employed at mine .....; (b) No. of hours per shift .....; (c) No. of shifts per day .....; per week .....; (d) Average number of days worked per week for preceding 8 weeks .....
7. Major defense contracts for which you are supplying materials (contracts having an A-10 rating or better are considered defense contracts):
.....
.....
8. Per cent. of total plant production going into defense work .....

MATERIAL OR EQUIPMENT INFORMATION

Use reverse side of sheet to give information requested below, making specific reference to item numbers.

9. List material or equipment required. *Where metal alloy is included in (a), (b) or (c)* state weight and type of alloy. *Where plates are included in (a), (b) or (c)*, state size, thickness and weight.
   (a) *Where breakdown is threatened:*
      (i) What circumstances show a breakdown is likely?
      (ii) Is the situation in the plant hazardous?
      (iii) Is further damage to other equipment probable?
   (b) *Where actual breakdown has occurred:*
      (i) Equipment broken down
      (ii) Date of breakdown
   (iii) Circumstances causing breakdown
   (iv) Effect of breakdown on plant production
   (c) *New Equipment:*
      (i) Manufacturer, type, size, use, and detailed reasons for purchase
      (ii) If replacing obsolete equipment, state as to such obsolete equipment: length of life, proposed disposal plan, and salvage value
10. Dealer .....
(Name and address)
11. Your purchase order No. ..... Date placed .....
12. Total cost $.....
13. Dealer requires ..... rating. Delivery date promised this rating .....
Next best rating ..... Delivery date promised on next best rating .....

Date .....
(Signature of applicant)

Rubber Further Restricted.—In a move to save more than 1,000 tons of crude rubber and latex a month, the War Production Board on March 30 amended Supplementary Order M-15-b, reducing the permitted consumption of crude rubber or latex in more than 50 products, and eliminating entirely the use of crude rubber or latex in about 20 products.

The Amendment (No. 7) also transfers more than 15 products from the lists which allow use of rubber up to certain percentages of a base period to lists of products for which manufacturers must have specific permission for the use of rubber or latex from the Rubber Branch of WPB.

The new list "A" of the order—that listing products for which crude may be used only up to certain percentages of the average monthly consumption for the year ended March 31, 1941—now contains 23 groups compared with the previous list of 31.

List B—products for which manufacturers must have specific permission—has been increased from 10 to 27.

Reductions in the permitted rates of consumption include the following:

Concentrator belts, industrial brake lining and clutch facings, polishing belts, and screen diaphragms, from 125 per cent. to 100 per cent.

Cleats and bucket pads, last puller belts, pulley lagging and round belts, from 100 per cent. to 80 per cent.

Acid, chemical, high-pressure, jetting and hydraulic, railroad, rotary drillers', and sandblast hose, from 125 per cent. to 100 per cent.

Fire and mill hose, from 40 per cent. to 30 per cent.

Hard-rubber pipe and fittings, rubber buckets, pails, etc., rubber insulators, fume ducts, etc., for handling corrosive materials, rubber pumps, and rubber covered rolls (except wringers, printers, finger print and business machines), from 100 per cent. to 85 per cent.

Storage-battery parts, hard-rubber sheets, insulated tools, and magneto parts, from 125 per cent. to 80 per cent.

Respirators, gas masks, mine safety battery and lamp parts, from 125 per cent. to 100 per cent.

Chute linings, oil-well specialties, sheet, strip and mechanical packings, and non-automotive vibration dampers, from 100 per cent. to 80 per cent.

Automotive parts, 75 per cent. to 50 per cent.

Electricians' gloves, 150 per cent to 100 per cent.

Among the products transferred from List A to List B (requiring application to the Rubber Branch for an allotment of crude rubber) are: Belt splicing and repair materials; elevator and conveyor belts; automotive V-belts; flat transmission and hog-beater belts; rubber-lined tanks, drums, and pipes; and cable-splicing compounds.

The revised order permits an increase from 80 per cent. to 100 per cent. in the consumption rate for gasoline, oil tank wagon, and sanitary hose.

Added to the permitted products are cement-gun hose, grease-gun hose, hydraulic control hose, 100 per cent.; molded cable connectors, and terminal blocks, 80 per cent.

Changes in list C—products in which latex can be consumed only in specific percentages—are as follows:

Use in flat and round belts is reduced from 85 per cent. to 75 per cent.; in latex insulation for fume ducts, fans, racks, pumps, valves, etc., from 25 per cent. to 15 per cent.

Transferred to list D—products which require permission for use of latex—are: Non-automotive V-belts.

Scarce Materials.—The second in the series of provisional reports on the relative scarcity of certain materials, prepared by the Conservation and Substitution Branch of the Bureau of Industrial Conservation, was made public April 17. The first report was issued March 12.

Harvey A. Anderson, chief of the branch, pointed out that many changes have been made since the first report and that many more items have been included. The major addition to the list is in materials for building construction.

The arrangement of the list is the same as in the first report; that is, in groups according to their availability for substitution or use in civilian industry. The status of the listed materials, and others as well, is constantly changing in relation to supply and demand.

Group 1 is made up of materials that generally are critically essential for the prosecution of the war. For these materials civilian industry must largely find substitutions or anticipate stoppage of manufacture of articles containing them. Chemicals derived from scarce metals are, in general, of the same order of scarcity as the metals.

Group 2 comprises materials also necessary for war production and essential industrial activity, but the supply is not so severely restricted. Necessary civilian industry may obtain limited supplies from this group, when specific cases are sufficiently urgent.

Group 3 includes materials that are more available for substitutions, although in no case, it was stressed, can the supply be considered unlimited, since other factors than the material itself may determine the amount available. The three groups of materials listed are as follows, after the elimination of materials of no special interest to the nonmetallic-minerals industries:

GROUP I

Materials Most Vitally Needed for War Purposes; Not Generally Available for Civilian Needs.

Miscellaneous Products

Asbestos (long fiber)	Mica Splittings
Burlap	Quartz
Graphite (Madagascar)	Crystals
Kyanite	Rubber

GROUP II

Basic Materials that are Essential to the War Industries but Whose Supply is not as Critically Limited as Materials of Group I.

Borax and Boric Acid	Manganese
Calcium	Natural Gas
Jute	Rubber (Reclaimed)
Kraft Paper	Sisal

GROUP III

Materials Available in Significant Quantities for other than Strictly War Purposes. However, the use may be restricted by accompanying manufacturing limitations. Restrictions are commonly imposed but supplies are not critically short, except in the case of iron and steel.

Preferred Substitute Materials:

Asbestos (common)	Lime
Asphalt	Mica (common)
Brick and Tile	Mineral Wool
Cement	Salt
Clay	Silica Sand
Coal and Coke	Stone: Granite
Concrete	Limestone
Diatomite	Marble
Emery	Slate
Feldspar	Sulphur
Fluorspar	Tripoli
Gilsonite	Vermiculite
Gypsum and Products	Wall Board

Track-laying Tractors.—Seeking to hasten the production of large track-laying tractors urgently needed for military, export and essential civilian uses, the War Production Board on April 9 ordered immediate and drastic curtailment in the output of smaller types used principally in agricultural operations.

Supplementary Limitation Order L-53-a prohibits production of the smaller types—those in the 17- to 35-horsepower class—after September 1. Track-laying tractors are those which obtain traction from a crawler or track-type device, and not from wheels.

Between now and the closing production date manufacturers will be permitted to make 3,035 tractors in the 17- to 35-horsepower class, as compared with their estimated possible production of 6,973 tractors for the remainder of this year. This is a reduction of 3,398 units.

The industry consists of only four companies, and the permitted production will be distributed as follows:

Allis-Chalmers Manufacturing Company	1,000
Caterpillar Tractor Company	1,000
Cleveland Tractor Company	435
International Harvester Company	600

Tractors to be produced under the program will be distributed by the WPB in accordance with the provisions of Limitation order L-53, which prohibits distributors from making deliveries except upon specific authorization of the Director of Industry Operations.

By permitting production of a reduced number of the small types until September 1, manufacturers will be able to balance inventories, build up stocks of spare parts, use up fabricated critical materials now on hand and purchase the necessary materials for production of larger-size models. It is expected that the gradual change-over to the larger size can be accomplished without disrupting production lines and without affecting the labor situation in the plants. In addition to military and export demands, the larger types are vitally needed for heavy-duty work in agricultural, mining, logging, oil production and other industrial operations.

Truck Maintenance.—Because of the increasing scarcity of tires, automotive parts and skilled labor, Joseph B. Eastman, Director of Defense Transportation, on April 18 issued a list of suggestions for the care and use of America's truck fleets. The maintenance of nearly 5,000,000 motor trucks in this country is costing nearly a billion dollars in labor and vital materials annually. Better operating practices, Mr. Eastman pointed out, will result in a decrease in the demand for new parts and materials, thereby diverting labor and materials directly into war production and increasing the number of vehicles available for service on the highways. Improved operating practices also will serve to expedite the rapid flow of goods through a reduction in road breakdowns, in the accident rate and in the truck owners' costs for labor and materials.

Preventive maintenance is the original "stitch in time" in automotive operation. The manuals of operation that are issued with new motor vehicles contain valuable information and suggestions.

Worn or damaged parts may largely be reclaimed or rebuilt. As the war progresses, parts will become harder to get because it is

necessary for factories to concentrate on actual fighting material. If many of the more expensive parts are rebuilt, the re-use of parts can be the means of saving large quantities of vital raw materials.

Among the typical parts, drive-shafts, worn at the joints because of neglect, need not be scrapped. Two new universal joints may be welded to the old tubes to make a serviceable assembly. Crank-shafts need not be scrapped even if they are so worn at the main or connecting-rod bearing surfaces that regrinds to standard sizes are impossible. Mechanics familiar with metal coating can reclaim the shafts by cleaning the foundation material, spraying the metal and then having it ground or machined to the required size. This process has many possibilities for replacing worn material in the automotive field.

Worn valve faces may now have hard-surfacing materials welded to them in much the same manner as that by which new aviation valves are made. This restores a valve, that may have lost so much material that it seats too low in the cylinder head, by building metal up to original dimensions and providing a hard, heat-resistant face.

Tire conservation can go a great deal further than it has in the past. One of the best ways to conserve tires on trucks is by organizing a systematic inspection program. Tires must be inflated regularly to the recommended pressures. Dual tires must be properly mated so that they will distribute the load evenly. Wheel alignment and other mechanical factors must be checked in order to prevent excessive wear, and foreign objects of all kinds must be removed from tires as soon as these are picked up, so that they cause but minimum damage.

Tires should be pulled for retreading as soon as the non-skid design has worn smooth. When they are attended to at this point in their wear, they may be retreaded several times. Every time a tire is retreaded, about 60 per cent. of the total rubber originally built into it is saved. When this is multiplied by the millions of tires in service, the savings can amount to many thousands of tons of rubber annually.

Truck Manufacture Stopped.—The War Production Board on April 12 ordered all production of medium and heavy trucks for civilian use discontinued after existing quotas have been completed. Thus, another large segment of the automotive industry must convert its facilities to the output of war weapons. Production of passenger cars and light trucks was halted February 1.

The stop-production order, Supplementary General Limitation Order L-1-e, applies also to off-the-highway vehicles for civilian use. These are heavy, rubber-tired vehicles too large for ordinary highway travel and used principally in construction and mining operations.

Chief reason for the production ban is the shortage of rubber. No tires are available. Therefore, it is necessary to restrict future production to that required for the Army and Navy, certain government agencies, the United Nations, and Lend-Lease operations.

Trucks produced between now and the time permitted for cleaning up present quotas will automatically be frozen under General Conservation Order M-100, which put into effect the truck-rationing plan now being administered through the joint facilities of WPB and the Office of Defense Transportation.

Under Supplementary Limitation Order L-1-f, producers of medium trucks (weighing from 9,000 to 16,000 pounds) were given until April 30 to complete production quotas fixed for February. After that date, further production for civilian use is halted since quotas originally established for March were cancelled.

Producers of heavy trucks (weighing 16,000 pounds or more) will have until May 31 to clean up amended March quotas. Then civilian output must cease. These trucks can not be equipped by the manufacturer with tires, casings or tubes.

When production ceases, it is estimated that 97,070 medium and heavy trucks will have been produced for civilian use since January 1, as compared with an output of 88,085 medium and heavy trucks during the first three months of 1941.

Off-the-highway vehicles weighing 24,000 pounds or more produced under March quotas may be equipped with tires and tubes only if they are specially designed to transport materials or equipment on mining, construction, logging or petroleum-development projects.

An A-3 preference rating for materials going into the production of medium, heavy and off-the-highway trucks will continue to be made available under Limited Preference Rating Order P-54.

The stop-production order does not apply to the output of truck trailers, bodies or passenger-carrier buses of certain types.

Truck Rationing.—With some 50,000 applications received during the first month's operation of the motor-truck rationing program, the Office of Defense Transportation has asked operators who can not meet the minimum qualifications to refrain from applying for new trucks, truck-tractors, or trailers. It is apparent that many of the applications were from operators seeking to buy trucks as they normally would under a business-as-usual economy.

The rationing plan, which is administered jointly by the Office of Defense Transportation and the War Production Board, went into effect March 9. General Conservation Order M-100, which set up the rationing plan, shows the order in which the demand for new vehicles will be met. The classes established, subject to change, are:

1. Vehicles used by the military forces in the field; police, fire fighting and other public health services; mail, telegraph, telephone and organized radio-communication services, and water-supply, sewage- and garbage-disposal and other sanitation services.

2. Vehicles used on fixed military and naval posts; transportation of all materials and equipment directly connected with the war effort, including farm and forest products; construction, maintenance and supply of essential railway, highway, water, pipeline, and air transportation facilities, transportation of materials for construction of defense-housing projects; transportation of materials for construction and maintenance of public utilities in addition to those classed under No. 1, and transportation of persons engaged in business and industry directly connected with the war effort.

3. Vehicles used to transport ice and fuel for heating and power to the ultimate consumer; farm and forest products indirectly connected with the war program; essential roofing, plumbing, heating, electrical, building and vehicle repair services; waste and scrap materials; persons in business and industry indirectly connected with the war program, and in the services of public and private schools.

4. Vehicles used to transport persons or goods not connected with the war program, including all forms of retail delivery except of ice and fuel.

5. Vehicles used for non-essential functions.

No encouragement is extended to persons who can qualify only under classes 4 and 5, which were set up to act as a guide only if the supply of trucks was not exhausted by classes 1, 2, and 3.

Those who can qualify in the higher classes should resort to application for new vehicles only after they have exhausted the following possibilities:

1. The used-truck market.
2. Leasing vehicles not being fully utilized by other operators.
3. Pooling equipment with other operators.
4. Maintaining present equipment better than ever before.
5. Working present equipment longer hours and more days.
6. Salvaging equipment which in normal times would not be used further.

Here is a brief picture of the supply situation:

There will be no production of trucks after the March quotas are completed; trailers are being produced in quantities much below normal production. The only certain supply of trucks is the pool now held by manufacturers and dealers, representing stocks frozen January 2 and the diminishing production of the first months this year.

In March, after Lend-Lease and other essential requirements had been met, this pool was estimated to consist of 150,000 truck and truck-tractor chassis. Broken down, the supply consists of 45,000 light, 95,000 medium and 10,000 heavy units.

The medium and heavy types—about 105,000 units in all—are the most important and are held for distribution over a period of 22 months.

In contrast to the supply available for the next two years, about 700,000 units were sold in the United States in 1941 alone. Therefore vehicles released must be used in operations necessary to the war effort or to the essential use of equipment already in use.

If persons who are not qualified to get vehicles will refrain from making applications, the work of making speedy decisions on the applications of qualified operators can be speeded, ODT officials said.

★ ★ ★ ★ ★

To keep 'em flying, keep on buying
Defense Stamps and Bonds

★ ★ ★ ★ ★

BURNING DOLOMITE FOR MAGNESIUM

By THERON C. TAYLER

A NUMBER of plants are being built in the United States to produce magnesium metal from dolomitic limestone. Dolomite is only one of many sources of magnesium metal. The production of magnesium may or may not remain a nonmetallic-mineral industry.

For every 12 tons of magnesium metal made from dolomite at least 100 tons of waste is produced. By a process soon to be in production almost half of this waste is a calcium ferrosilicate. Anyone with a practical use for this by-product holds one key to the permanence of a new industry.

This new industry is facing many problems mostly of an engineering nature. The first and most important of these is that of so burning the dolomite as to leave the magnesium available for recovery.

Burning Problem.—Because the tonnage of each of these plants is large, no doubt each will use rotary kilns for calcining the dolomite. To recover the magnesium from the lime the latter must be soft-burned as in making finishing lime. The record of the use of rotary kilns for soft-burning dolomitic stone is one of consistent failures.

Cement, high-calcium lime, and dead-burned dolomite are satisfactorily burned in rotary kilns, so it may be asked, why not dolomite for finishing lime? The problem is one of burning temperature. Portland cement is burned at approximately 2,750 degrees F., dead-burned dolomite at above 2,600 degrees F., high-calcium lime at 2,450 degrees F., and finishing dolomitic lime at 2,100 degrees F. maximum. It is easy to get the higher temperatures. Much trouble with overburning is experienced by high-calcium producers. Temperatures of 1,800 degrees to 2,100 degrees for soft-burning dolomite can not be maintained by any of the ordinary methods of rotary-kiln burning. Burning with excess air is no solution to this problem; increasing the air shortens the flame and makes matters worse. Wood or perhaps even blast-furnace gas as a fuel might be a practical solution under some conditions.

Standard practice requires that the product flow through the kiln, counter to the gas (Figure 1). This puts the highest-temperature portion of the flame in contact with the lime after calcination is completed. The lime in this condition has no appreciable capacity to absorb heat. Its temperature quickly rises to closely approximate the flame temperature.

One producer of high-calcium lime resorted to parallel flow (Figure 2) with the result that he completely avoids overburning. His hottest flame is in contact with cold stone where it can do no damage. The thermal efficiency is very low and there are other complications.

Dolomite can be burned properly and with efficiency. One way to accomplish this is to use a parallel-flow kiln with a waste-heat boiler (Figure 3). This is practical only where the demand for steam is large in comparison with the lime requirements.

It is desirable generally to keep the processing separate from the boilers. The kiln should be a unit, efficient by itself, and subject to no controls other than those affecting the quality and the quantity of the product. Such a unit should consist of a short rotary section to be used for calcining only; heating the stone to calcination temperature should be done in a separate preheater (Figure 4). The flame must be almost as long as the calciner and so controlled that its temperature can not exceed 2,150 degrees F. at any point within 25 feet of the point of lime discharge. Instead of the usual rotary-kiln thermal efficiency of 20 to 35 per cent., this unit is designed for 50- to 70-per cent. efficiency.

The preheater may take any one of many forms. It may be designed to function on a wide variety of stone sizes or to eliminate all under-size stone; it may act as an eliminator of dust from both the stone and the gases; it may weigh into the kiln predried and dust-free stone at an exact amount per kiln revolution; it may include a by-pass to allow the kiln to be operated without a preheater if so desired. It may be of the counter-flow or cross-flow type.

The cooler may be of similar design or of one of several conventional types. The selection of both the cooler and preheater types will be narrowed down somewhat by the necessity for getting a specific form and intensity of flame.

Before making an arbitrary decision upon the type of flame it is good to make a heat balance by 10-foot zones from end to end of the kiln and follow the heat balance through the entire system. Such an analysis will quickly disclose the need for either high preheat to the combustion air or the installation

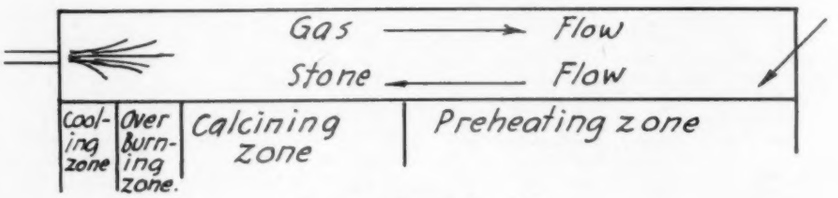


Figure 1. Counter-flow kiln.

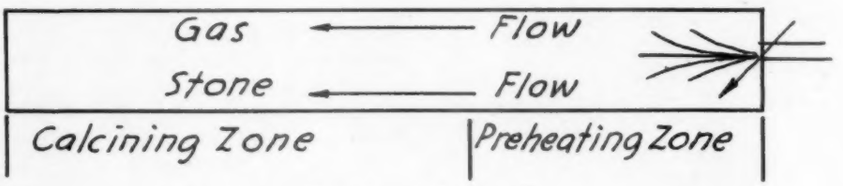


Figure 2. Parallel-flow kiln.

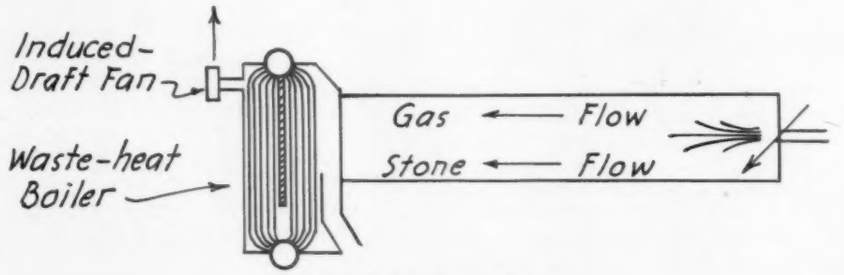


Figure 3. Parallel flow with boiler.

of two burners, one for the short flame, the other to burn far from the firing hood. In any event there is need for two zones of high-heat generation with an intermediate zone in which heat generation should approach zero.

Other factors which a series of such heat balances by zones will disclose are the relationships between overburning and efficiencies, the need for a more effective preheater than that obtainable in the form of an elongated kiln, the need for kiln insulation (in the burning zone), the need for reducing to the minimum the use of high-level heat for low-level work (gases above calcining temperature for heating stone that is below calcining temperature), and the need to operate the kiln at absolutely constant speed and at constant weight fed per revolution.

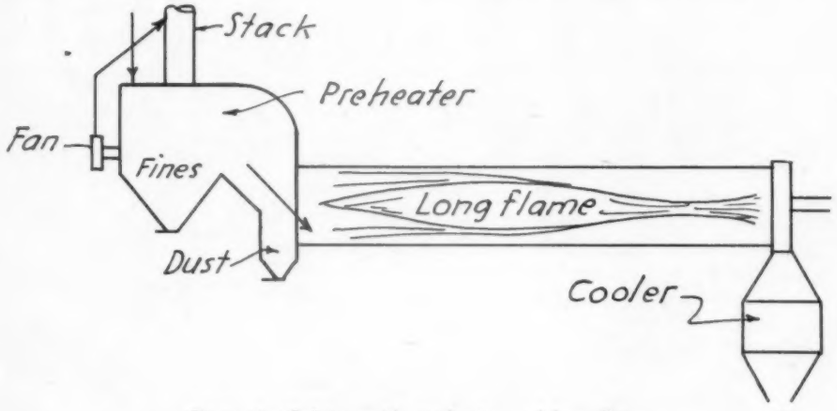


Figure 4. Calciner with pre-heater and long flame.

A flow diagram such as that shown in Figure 5 should be made up to indicate heat and weight balances. The diagram indicates a rotary calciner with one form of preheater which is on the market and a rotary cooler. The figures given are preliminary rough approximations intended only to illustrate the method.

The last two diagrams (Figures 4 and 5) are intended to outline an efficient and large-capacity means for soft-burning dolomite. It involves much that is special. Many have dabbled with the items that go to make up this method but no half-way measures will be sufficient.

Fundamental Concepts.—1. No one with experience in the burning of limestone in rotary kilns will dispute the need for accurate stone sizing. Stone can not be uniformly burned if the largest particle exceeds one and one-half times the smallest.

2. High air preheat is necessary to minimize the variations in heat requirements from the first 5-foot zone to the next and to each subsequent equal section of the kiln.

3. A long kiln is no answer to the needs for effective and efficient stone preheating. Heat is very ineffectively transferred from the gases to the stone by radiation. It can be most effectively transferred by convection. The losses by radiation from the exterior surfaces of a preheater are only a small fraction of similar losses from the kiln surfaces required to get equal results, if equal results are possible. It has been said that more heat can be transferred in a 2-foot bed of stone in a preheater than in several hundred feet of rotary kiln.

4. A kiln with a preheater will burn about 60 per cent. as much fuel as a kiln of twice the length without a preheater. The reduction in heat generation reduces the problem of disposal of this heat without overburning the lime.

5. A study of kiln internal heat balances from section to section will disclose that much heat is required close to the firing hood to raise the temperature of gases to about 2,000 degrees F. In the next zone it is important that the gas temperature shall not rise so high as to vitrify any lime surfaces. It must not exceed 2,150 degrees F. In successive zones a large heat release from the gases is required to calcine the lime. Burners can be designed to give such results provided the changes in heat generation from zone to zone are not too great. If, because of lack of air preheat, the heat generation in the first zone must be large, we may expect to find it necessary to use two burners, one for the short flame, the other for the long.

6. If pulverized fuel is used, its size is of great importance. The large particles drop out of the air stream, become smothered in the lime, contaminate the latter, and represent a waste of fuel. A particle must not be so large that, even with delayed combustion, it will not be completely burned in the fraction of a second that elapses from the time it leaves the burner tip until it passes from the burning zone.

7. Contrary to general belief, preheating combustion air delays combustion. A particle of coal just passing a 100-mesh screen is .006 inch in diameter. It requires for combustion all the 70-degree air in a cube .2 inch square. If we preheat the air to 600 degrees F., the volume is doubled; the cube is .25 inch square, the air has 24 per cent. farther to travel to contact the fuel.

8. The density of the furnace gases decreases as the temperature rises; the oxygen molecules become more widely dispersed, and require more time to reach the particles of fuel.

9. Air is only 21 per cent. oxygen; the 70 per cent. nitrogen is an inert dilutent. When pure oxygen is used, the flame is very short and intensely hot; the rate of flame propagation is very high. Air gives a flame of lower intensity. Adding further inert gas, nitrogen or carbon dioxide or both, is very effective at further lengthening the

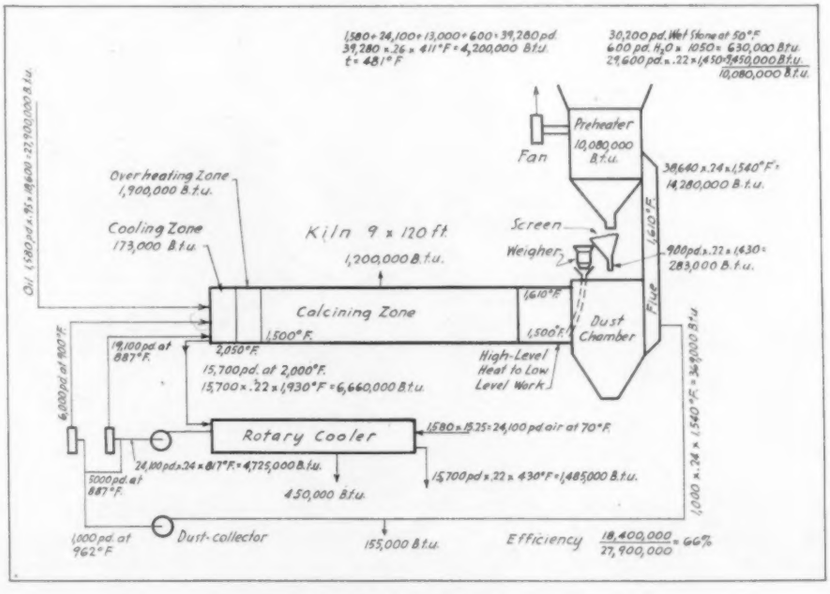


Figure 5. Flow Diagram.

flame and reducing its intensity. It amounts to increasing the size of the cube which contains the oxygen for each particle of fuel.

10. The viscosity of the air is high at high temperatures; the viscosity of nitrogen is higher and that of CO_2 is still higher. The high viscosity of the inert gases delays combustion.

11. Moisture in the fuel must be evaporated before ignition can take place; it delays ignition. It is necessary to remove it in the grinding operation.

12. The volatile fraction of the fuel is expelled and burns with a luminous flame before the fixed carbon receives any air for combustion. High-volatile fuels are said to require more primary air than those low in volatile content. At the same time we must consider restricting the amount of the primary air to the requirements for heat generation in that first zone close to the firing hood.

13. Turbulence is required to bring the fuel particles into contact with the widely-dispersed oxygen molecules. To obtain a long flame turbulence must be avoided close to the burner where oxygen is plentiful and the molecules are relatively close to the fuel particles. The kinetic energy of the jet of air and fuel must be conserved to create turbulence at a distance from the burner where the molecules of oxygen are widely separated from each other and from the fuel particles. The roughness of the furnace walls and the movement of stone may be used to increase the turbulence in those zones farthest from the firing hood.

14. The rate of flame propagation depends upon the nature of the fuel and the richness of the mixture.

15. The velocity of the air and fuel leaving the burner is of much importance. Upon it depends the distance from the burner at which ignition takes place. Upon the maintenance of velocity, the avoidance of change in kinetic energy, depends turbulence, the length of the flame and the location of points of maximum heat generation.

16. The kinetic energy in the jet is the source for creating turbulence. The velocity is maintained high for such distance as is required; the energy in the jet is then used to create turbulence to bring the last particles of fuel into contact with the last of the available oxygen to create much heat where it can cause no overburning.

17. The radiation of heat from flame to stone in each 5-foot zone must be equal to, or less than, the capacity of the gases, lime, stone, and kiln shell of that zone to receive the heat without overheating the lime.

Eldred System.—The extraction of a small percentage of inert gases at temperatures of 1,400 to 1,500 degrees F. and their reintroduction into or near the burner has long been used in shaft-kiln practice for soft-burning lime. It is known as the Eldred system. It has been very effective where properly installed. Proper installation requires that the extraction take place from the zone marking the end of the stone-preheating section and the beginning of the calcination zone. To use the Eldred system effectively with a rotary kiln requires the separation of the calcining and the preheating operation. The flow diagram given in Figure 5 is fundamentally nothing but the adaptation of the Eldred system to a rotary kiln. It is important that we draw a distinction between the introduction of inert gases to control the rate of burning and the mixing of low-temperature gases with high-temperature gases to get gases with an intermediate temperature. Such a misinterpretation of the purpose of the Eldred system would create a very inefficient installation.

Details of Importance.—A departure from standard practice in rotary-kiln plant design sets up many engineering problems involving limitations in the selection of accessories. The burner must be of a special Bunsen design in which particular care has been taken to avoid whirl. Setting the burner out of the center of the hood and at an angle to create a rifling action to the flame might well be considered.

Insulating the firing zone is important; it has been done successfully even when higher temperatures were involved.

Visual control has no place in such a plant. The operator can not see far enough into the kiln to determine the burning conditions in the calcining zone. Even the radiation pyrometer may lack the range required. Pyrometers inserted through the kiln shell may be the only practical means for control.

Results.—There is no background of successful installations of the kind outlined. The beaten path is one of failures. We have no choice; we must be pioneers into a new field or accept defeat. We have theory, basic facts and engineering research available. It should be possible to translate these into a workable installation with nothing worse than minor difficulties to be corrected after operation has started. We can be reasonably sure that some of the troubles that accompany standard kiln practice will be overcome; hot zones are eliminated; ring formation should be minimized; roofs over insulated kilns may be quite unnecessary.

To those who may ask, "Is it all worth while?," it may be said that anything that is worth doing at all is worth doing right. The emergency requires action, but action without result is waste. It will cost less and provide magnesium metal in quantity at an earlier date if the job is done right in the first attempt.

Whiting Substitutes Readily Available

Although the war has restricted the importation of whiting—a fine-grained preparation of calcium carbonate used as a filler in the manufacture of rubber—the United States has large deposits of white limestone and marble which should prove capable of producing enough whiting for domestic needs, according to Dr. R. R. Sayers, director of the Bureau of Mines.

In addition to limestone and marble as sources, whiting is obtained by grinding or pulverizing chalk and dolomite and by a chemical process in which pure lime is treated with carbon dioxide.

To encourage the domestic industry, the Bureau began a study in 1931 of the preparation of whiting from the Nation's raw materials. A report on that research was published in 1937. In the latest report, Dr. Oliver Bowles, assistant chief of the Nonmetal Economics Division of the Bureau, describes the different classes of whiting and their wide uses, the processes of manufacture and areas where the most important sources of raw material are located.

Large quantities of whiting are used by the paint industry, but the material also plays important roles in the manufacture of many other products, including: glazes and enamels for ceramic products, putty, paper, white ink, shoe dressing, soap, cosmetics, crayons, tooth powder and tooth paste, medicines, linoleum, gypsum plaster, cigarette paper, roofing cement, sealing wax, acoustic tile and even dolls and fireworks.

Under the name of "rock-dust," pulverized limestone is spread on the interiors of many coal mines to render coal dust incombustible so it will not explode or propagate explosions of methane gas, a natural gas found in the mines. The Bureau long has advocated rock-dusting in all coal mines.

Darker calcium carbonate powders, not sufficiently light in color to be known as whiting or Paris white, are used as fillers in asphalt, rubber and fertilizers.

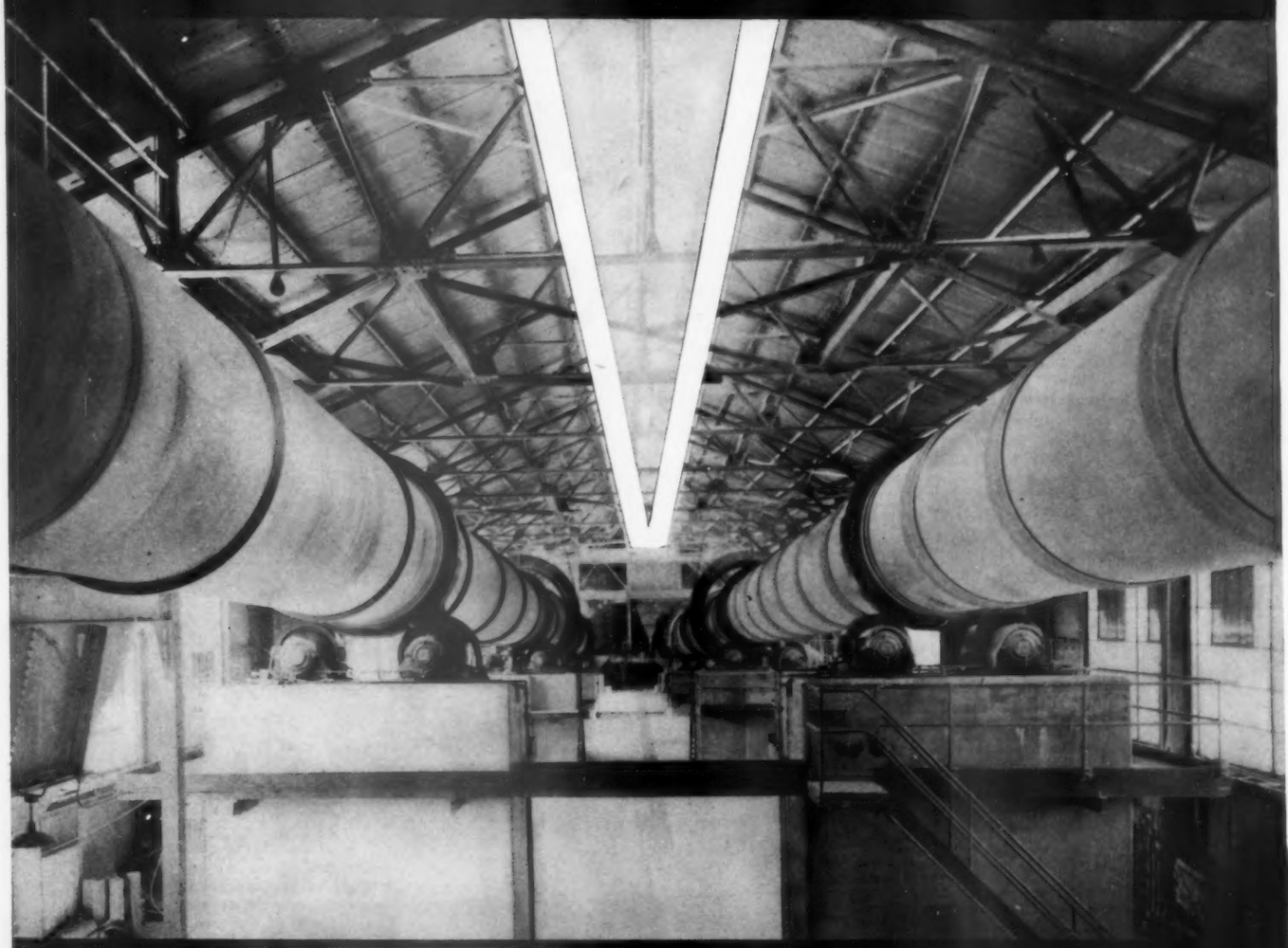
Dr. Bowles states that to deserve the name of whiting, a product should be able to pass a 200-mesh screen.

A copy of the report may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, D. C., for Information Circular 7197, *Chalk and Whiting*, by Oliver Bowles.

LIME AND QUARRY Special

LIME SECTION

UNAX ROTARY KILNS
FOR CEMENT—LIME—ORE



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General view of the operations at Lewisburg. Lime kilns at left, crushing plant at right.

HIGH-CALCIUM LIME BURNED EFFICIENTLY IN MARBLE CLIFF'S NEW VERTICAL KILNS

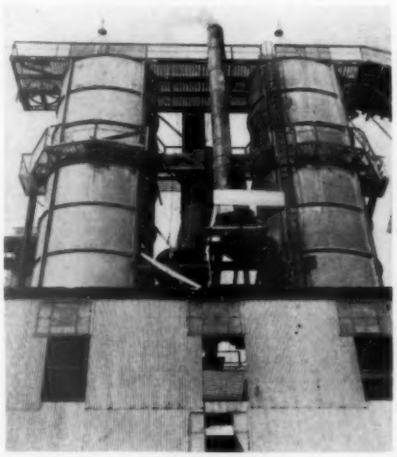
THE plant of the Marble Cliff Quarries Company at Lewisburg, in Preble County, Ohio, is one of the few large new vertical-kiln lime plants built in recent years. It has now completed its first year of successful production of high-calcium lime, a product few plants in the state can make. An old crushed-road-stone plant has been converted to prepare the stone for the kilns and to produce fluxing stone, and the former quarrying operations have been replaced by mining. The lime produced is marketed for fluxing and metallurgical purposes, for water-softening, for paper manufacture, and a wide variety of chemical purposes.

The site of the operations is at the old Lewisburg Stone Company plant which was operated by the National Lime & Stone Company for the production of road stone. The deposit consisted of about 67 feet of stone suitable for this use from 6 to 8 feet of overburden which was removed. Under this stone is a 10-foot vein of high-calcium limestone. As the new owners had no desire to produce road stone, it was decided to adopt mining methods to get the desired stone. The development of the mine was begun in August, 1940. Meanwhile the lime plant was supplied by open quarrying which was necessary to bring the quarry level down to that of the mine. In September, 1941, the mine was developed sufficiently to supply the full needs of the plant and the quarrying operations were discontinued.

In the early phases of this transition an old steam shovel loaded stone into a car which was hauled up an incline to the crushing plant. When operations went under ground this equipment was abandoned and stone was loaded by hand into dump trucks which hauled it up a road and ramp to the primary crusher. An air-operated underground shovel or mucker

By W. E. TRAUFFER

was then put in service, followed by two others as soon as space allowed. These did not prove satisfactory, however, so on February 22, 1942, they were replaced by a Joy loader which has proved itself well able to supply the necessary 600 tons of stone to the plant in an 8-hour day. The dump trucks were replaced in March, 1941, by Ford trucks equipped with low-slung Hercules 6-ton hydraulic-dump



The two 65-foot kilns with draft fans and piping.

bodies and powered with Hercules Diesel engines. Two similar units were added later.

The mine is being worked by the familiar room-and-pillar method from 16-foot-wide main and cross tunnels. The rooms are 20 feet by 40 feet and the pillars are the same size. Wherever possible the workings have been cut through to the quarry face and this practice has resulted in excellent natural ventilation. A Jeffrey aerodyne blower and ventilation duct are installed, but they will not be needed until the mine has been extended much farther from the face.

Drilling is usually carried on simultaneously in two places, in each of which two Ingersoll-Rand DR 30 drifter drills are mounted as a jumbo on an old truck chassis. The first two rows of holes are drilled about 3½ feet on either side of the center line and are drilled in the form of a V, the apex being the center line about 6 feet ahead in the face. The second two rows of holes are drilled on either side of the V holes and are drilled almost perpendicular to the face. The third two rows of holes at each rib are about 7 feet on either side of the center line and slope toward the rib, thus making a 16-foot wide by 6-foot advance cut. Four feet of stone on each side is shot from the rib with each advance shot, making the total width 24 feet by 10 feet high with a 6-foot advance. The 4 feet on each side at the rib is carried about 8 feet back of the face in order to drill both the face and the ribs with one setting of the jumbo. All the holes are loaded at the same time and are shot with

This view shows fluxing stone being loaded into car. Inclined track to kilns at right center.

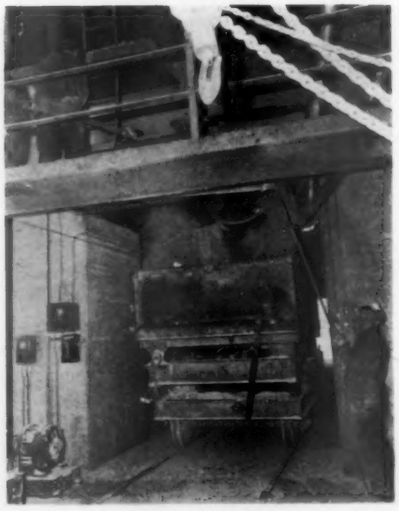
Drag-conveyor and elevator which carry coal from cars to bin above the gas producer.

Automatic weighing feeder which discharges lime to pre-hydrating conveyor.

The fully-inclosed 4- by 6-foot vibrating screen which separates lump lime.

Drawing car discharging lime from kiln on dust-collecting system.

Small plant used to produce agricultural limestone.



Lime being drawn from one of the kilns to car for discharge to picking belt.

regular No. 1 and No. 2 delay electric exploders. American Cyanamid 40-per cent. ammonia explosive is used and, on the average, 2 tons of stone is recovered per pound used. Air for these drills and for the plant's needs is supplied by an Ingersoll-Rand compressor at the plant.

The Joy loader is the 11-BU type which is rated at 5 tons per minute. It is electric-powered and mounted on crawlers. Its maximum over-all height is 4 feet and it is 7 feet wide and 25 feet long. Usually all the five trucks are required, as the haul to the primary crusher is now about 1,500 feet.

The stone is dumped from the trucks into the No. 28 Allis-Chalmers Superior McCully primary crusher which reduces it to 10-inch size and under. A bucket-elevator discharges the stone on a 5- by 12-foot Tyler Type F600 two-deck screen which is equipped with 6- and 2½-inch wire cloth. The 6- to 8-inch stone is discharged on a Jeffrey pan-conveyor from which it is loaded into cars as fluxing stone.

The minus-2½-inch stone from this screen is taken by another elevator to a 5- by 20-foot revolving screen followed by a Niagara vibrating screen. The plus-1½-inch stone goes through a No. 6 Austin gyratory crusher and is returned to the same elevator. Most of the 1½-inch stone is shipped to Columbus for use in the rotary-kiln plant there and some of it is stock-piled. The ¾-inch stone is stock-piled for possible future rotary-kiln use. The ½-inch stone is stock-piled for the same purpose or for further processing in a stone-meal plant operated by the company. The minus-⅜-inch product is sold as coarse agricultural.

The 2½- to 6-inch rock from the Tyler screen is kiln feed and goes to a Jeffrey 48-inch wide bucket-elevator on 70-foot centers. This stone can be discharged by means of a flop gate into either of two 400-ton cylindrical steel bins through vertical chutes which are baffled for their full height to reduce breakage of the stone. Under each bin is a 4- by 6-foot Jeffrey-Traylor vibrating feeder. The stone is loaded from either bin into a 6-ton car of the company's own design which discharges from both sides. This car is hauled to the top of the kilns by a Thomas hoist equipped with two electric motors. A 50-horsepower motor hauls the car up the incline while a 15-horsepower motor is used when the car is on a level at either the top or bottom of the incline.

The two vertical lime kilns are of the large-capacity Azbe type and each is producing about 50 tons daily. Each kiln is 65 feet high from the bottom of the cooling chamber and 53 feet

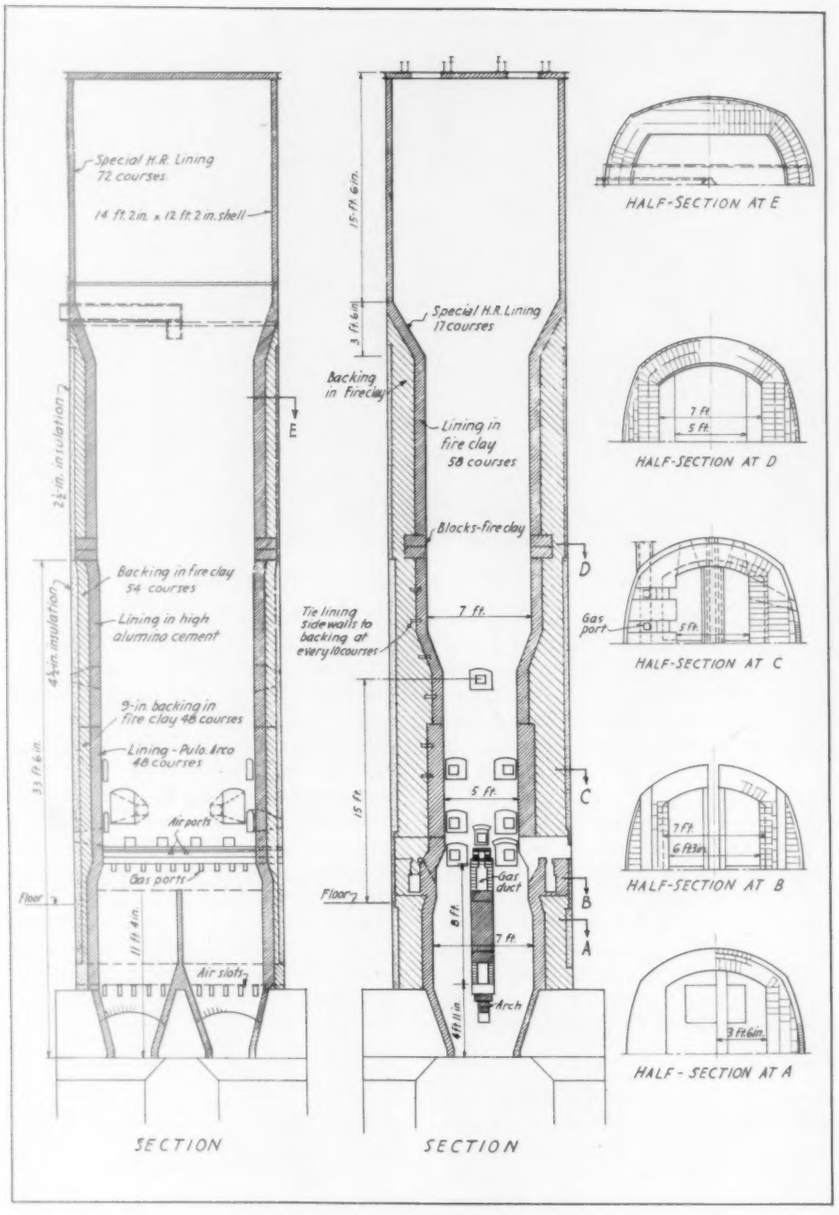
Mine loader filling a motor truck with stone.

from the poke holes. The cross section varies in diameter and shape at various points. The cylindrical storage chamber is 15½ feet in diameter and is lined with one 4½-inch course of brick. In a distance of 3½ feet this section becomes 7 feet by 10 feet 1 inch. Then in 2½ feet the chamber becomes 6 feet by 10 feet 5 inches in cross section and this continues to the bottom of the poke holes which are level with the top of the center-burner gas duct. The cross-section again becomes circular at this point and widens to a diameter of 7 feet and then 7½ feet for the cooling section above the lined steel discharge cone.

Azbe center and side burners are used. The side ducts are lined with Harbison-Walker 70-per cent. alumina brick and McLeod & Henry Company Carbex is used over the top of the center burner. There are 6 poke holes on each side of a kiln and 7 on each end. Originally CO_2 gas was taken out of the kilns through off-take pipes with a separate fan and introduced into the kilns above the poke holes. This practice has been discontinued. Now CO_2 gas is used only in the R. D. Wood Type SB10 gas producer which makes the gas used to fire both kilns. This gas is taken out of the main draft stack by the producer fan in the desired proportion to keep the coal bed in the producer at the proper level. About 25 tons of coal is used in the burning of 100 tons of lime. The producer is equipped with Hays temperature and draft gages and similar instruments record the top and bottom pressures in the kilns.

Each of the kilns had been drawn every 2 hours, but recently this interval was changed to 3 hours and this is done alternately so that a draw is being made

The hydrator, formerly of the batch type, as converted to a continuous unit.



Sectional drawings of the type of kiln used at the Lewisburg plant, showing refractory linings.

every 1½ hours. Each kiln is drawn through two sets of lever-operated clam-shell gates into a 6-ton side-dump car of the company's own design on a track under the kilns. The size of each draw is left to the operator's judgment, but is usually from 6 to 7 tons. The car is propelled by a 10-horsepower motor and a Falk speed-reducer for which power is secured through a trolley. The car is tilted for dumping by a 5-horsepower motor which operates a twin hydraulic hoist.

The lime is discharged on the horizontal section of a Jeffrey 30-inch by 46-foot pan-conveyor. The picking is done on the inclined section of this conveyor and the spalls average less than 5 per cent. of the total material. The lime is discharged from the conveyor through a chute to a 4- by 6-foot Tyler Type F-300 Ty-Rock 1-deck screen which is fully inclosed. Wire cloth with 2-inch openings is used. The oversize is lump lime, 2 to 6 inches in size, and this can be discharged through a split chute on a 24-inch by 22-foot Jeffrey shuttle belt-conveyor for loading into box-cars. There is little demand for this product at present.

Usually the lump lime is discharged into a 10- by 36-inch Eagle roller-bearing jaw crusher which reduces it to 1½-inch size and under. The product of this crusher is discharged with the minus-2-inch lime from the screen on a 24-inch by 43-foot Jeffrey belt-conveyor to a 78-foot Jeffrey bucket-elevator which feeds a 4- by 6-foot Tyler Hum-mer 2-deck screen. This is also fully inclosed and is equipped with ¾- and ⅜-inch wire cloth. The ¾- to 1½-inch lump lime is usually discharged into one of three 125-ton cylindrical steel bins from which a Jeffrey 24-inch by 32-foot shuttle belt-conveyor loads it into cars. The ⅜- to ¾-inch lump lime is usually discharged into the second bin and the same shuttle conveyor is used for loading it into cars.

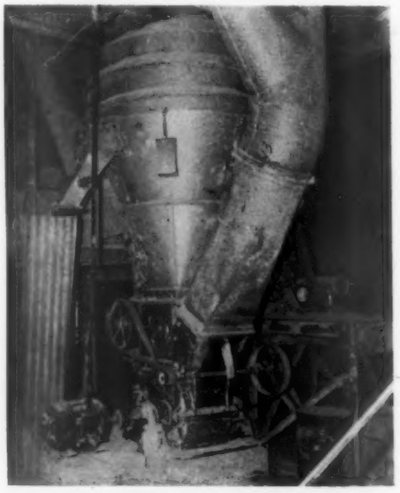
The minus ⅜-inch lime always goes into the third bin which is used for hydrator feed and the other two sizes can also be diverted from the screen

One of the 6-ton-capacity cars which carries stone up the charging incline.

into this bin if the demand for hydrate is great. A Schaffer Poidometer controls the rate of feed from this bin to the hydrator and to make occasional checks on the actual total feed per hour. This accurate control has proved to be important in the production of a consistently high-grade product.

The batch hydrator is a 2-ton Clyde, which was converted into a 4-ton continuous machine. The Poidometer ac-

(Continued on page 62)



Automatic pulverizer (beater-mill) with 5½-foot dual whizzer which pulverizes rejects from the separator.

By T. R. ELLERBECK

Vice-President, Utah Lime & Stone Company, Salt Lake City

Figure 1—(Left) Observation-port side view of two Ellernan calciners which have been operating oil-fired. The one in the foreground is being changed to coal (stoker) firing by the addition of a "Dutch oven."

Figure 2—(Right) The combustion and tempering chamber side view showing one oil burner and the automatic-discharge-drive mechanism.

Vertical Kiln of New Design Calcines Smaller Sizes of Crushed Limestone

THERE has long been a demand among lime producers for a small, compact, automatic, vertical calciner to burn crushed limestone and spalls. This demand is in part due to the fact that many lime producers have accumulated large stocks of minus-2-inch stone which was too small to be burned satisfactorily in the usual shaft kiln. Though this smaller-size stone could be burned in rotary kilns, the higher fuel cost incident to rotary-kiln operation, together with the high initial cost of the smallest feasible rotary kiln, make it undesirable for some producers to resort to the use of rotary kilns. Calciners which will burn crushed limestone are desirable because the crushed product, especially in a small operation, can be produced more cheaply than the larger hand-sized stone; also, the fines, which must be disposed of, do not form as large a proportion of the mined stone and, consequently, are not as serious a problem as when the larger stone is used. Furthermore, mechanical handling of the feed and discharge is greatly simplified with the use of crushed material. The time of calcination is also greatly lessened when treating the smaller-sized stone.

It was to meet the demand for this type of kiln that the Ellernan calciner was designed. From the photographs and cross-sectional sketch it can be seen that the unit is of an entirely new design and radically different from any previous lime kiln. It is very compact and acts as a preheater, calciner, and cooler simultaneously.

The calciners are designed in two sizes: one to burn stone from ¼ to ⅜ inch in size and produce 5 tons of burned lime per day; the other to burn stone from ⅜ inch to 1½ inches in size and produce 10 tons of lime per day. The units can be installed in pairs and straight crushed rock in sizes from ¼ inch to 1½ inches may be burned, the rock being screened over two storage bins and the minus-⅜-inch stone going into the storage bin for one calcining unit and the plus-⅜-inch stone to the storage bin for the other unit. In this way straight crushed rock such as would be fed to a rotary kiln is utilized in these vertical units.

It will be noted that the units are designed for relatively-small daily capacities. Larger-capacity units may be easily designed but it is not the intention to do this for the following reasons: A producer who is dependent upon one or two large-capacity kilns for his entire production is forced to operate under a handicap when business conditions make it necessary or desirable to operate at 20 or 30 per cent. of his capacity. Then the efficiency is apt to decline seriously, causing production costs to increase at a time when it hurts the most. He is also faced with the undesirable condition that when kiln repairs are necessary, one-half or the entire plant output is stopped while these repairs are being made. In direct contrast to this, if the same plant capacity is made up of a multiplicity of the smaller units, uninterrupted production is assured and calcining efficiency is maintained regardless of the percentage of plant capacity being utilized. This multiplicity of units also makes it possible for a producer to simultaneously calcine different types of lime such as dolomite, high-calcium, hard-burned or soft-burned.

Description.—The unit is automatic and of continuous operating design; that is, there is automatic and continuous discharge of the finished material, which conditions naturally cause continuous flow of the material through the unit. With such a continuous flow of material, balanced conditions of draft, temperature and heat transfer are arrived at and maintained. By maintaining a balanced condition a uniformly-calcined product is secured, and uniform calcination is a prerequisite of uniform quality. Automatic charging and discharging also reduce the amount of operating labor.

An efficient heat balance is attained by reducing the heat wasted to the minimum, by reducing the exhaust-gas temperature to approximately 500 degrees F., cooling the discharged lime to approximately 120 degrees and insulating the relatively-small hot zone. Excessive air infiltration into the system is eliminated, although there are no mechanical air seals used at any point in the system. Any tendency for infiltration of air at the open top is taken care of by having a sufficient thickness of rock in the charging hopper, which remains constant and is independent of any change in the quantity of material in the storage bin. This fixed-level hopper is of sufficient height as compared to the height of the calcining zone so that air leakage is practically eliminated. At the bottom of the kiln, which is open to the atmosphere, the air seal is effected by having a considerable amount of burned lime in the cooling section. This is also of sufficient depth thickness as to allow only enough air

to filter up through the lime to cool it to the desired temperature.

The unit is designed so that the temperature of the calcining gases entering the calcining chamber can be varied at will in order that the most desirable temperature for a certain limestone, or to secure the desired qualities of the final product, can be determined and then maintained.

The total power requirements for both the induced-draft blower and the discharge drive is approximately ½ horsepower per ton of daily capacity.

The units may be fired with oil, gas, or coal (stoker-fired), the fuel consumption being a little over 6,000,000 B.t.u. per ton of lime. With slight modification the units may also be operated with mixed feed, but the quality of the lime is inferior as compared with that produced with standard operation.

Once the unit is put into operation and the conditions of draft, temperatures, rate of draw, etc., are balanced, they continue to stay in balance and the units require practically no attention. How uniformly operating conditions

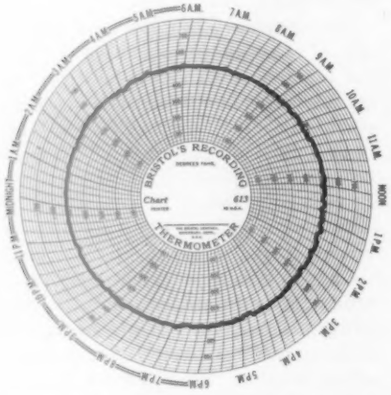


Figure 3—A typical exhaust-gas temperature chart.

are maintained is shown by the exhaust-gas temperature chart (Figure 3).

Operation Characteristics. — General specifications and operating characteristics of the two units illustrated in Figure 1, one of which has been in practically continuous operation for a year and the other for 4 months, follow:

Rock size—plus-$^{3}/_{16}$, minus-$^{5}/_{8}$-inch.
Draft—1.7 inches of water.
Temperature of calcining gases—2,350 degrees F.
Temperature of exhaust gas—520 degrees F.
Temperature of discharged lime — 135 degrees F.
Firing method—2 oil burners
Discharge—Continuous.
Mechanical air seals—None.
Exterior heat-radiation surface (insulated)—120 square feet.
Total height of brick work—5 feet.
Over-all height of calciner from floor to top of feed hopper—14 feet.
Outside calciner dimensions—7 feet by 4½ feet.
Lime output per square foot of inside area per day—2,000 pounds.
Total weight of calciner complete with support and feed hopper—10 tons.
Weight per ton of daily capacity—445 pounds.
Time of travel through both preheating and calcining zones—1⅓ hour.
Power requirements per ton of daily capacity—½ horsepower.
Fuel consumption per ton of lime—6,200,000 B.t.u.
24-hr. capacity of burned lime — each unit—4.5 tons.

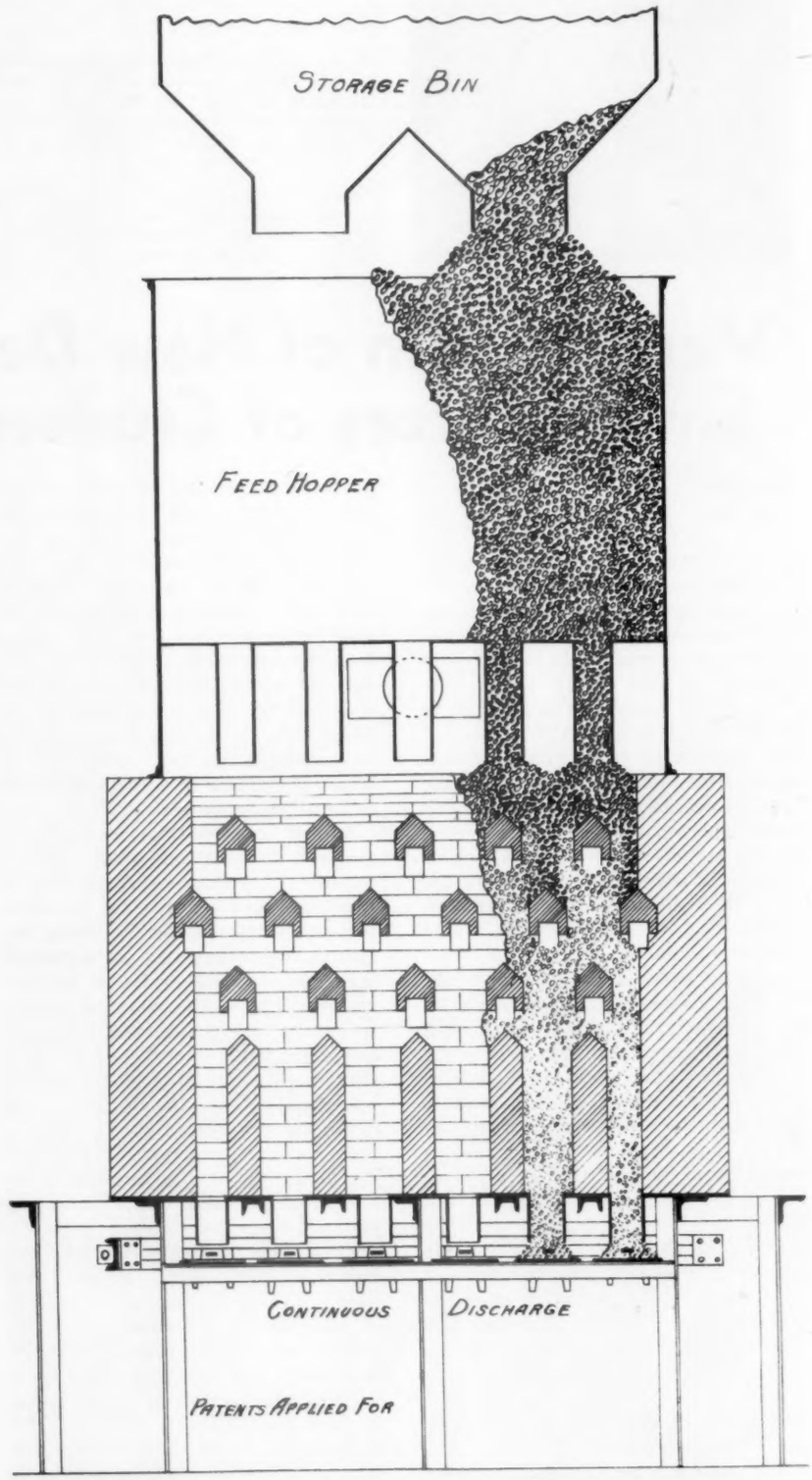


Figure 4—Vertical section of the Ellernan calcining unit showing the general design and flow of material.

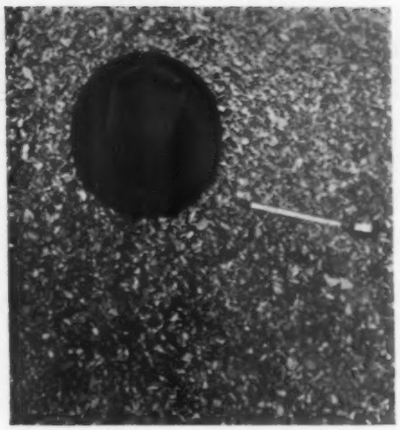


Figure 5—Showing the size limestone being calcined.

Design Features.—In calcining limestone it has been standard practice to use a combustion flame which has a very high temperature, compared with the temperature at which the material should be calcined, in order to produce a high-quality product. It is also the usual practice to have the high-temperature combustion flame enter the calcining chamber and, so, to come in direct contact with the stone being treated. An attempt is made to pass the material through this excessively-high-temperature calcining zone fast enough so that the material is not heated above the desired temperature in passing through it. This might possibly be satisfactory if each and every stone particle being treated were of identical size and shape. However, in actual practice the gradation in the sizes of the stone treated simultaneously will show considerable variation. When stone composed of mixed sizes passes through a calcining zone in counter-flow to hot gases of excessively-high temperature, the smaller pieces become completely calcined sooner than do the larger pieces. Since the larger pieces must be kept in the calcining zone until they are completely calcined, it follows that the temperature of the smaller pieces is unavoidably raised to a point greatly in excess of that required for calcining. In calcining lime this is a very undesirable condition and seriously impairs the quality of the finer material and consequently reduces the average quality of the total calcined material. In the Ellernan calciner this undesirable condition is to a large extent avoided through the use of a separate combustion and tempering chamber (Figure 2). Herein the combustion takes place and the high-temperature combustion gases at approximately 2,800 degrees F. are then completely intermixed and tempered with either atmospheric air or recirculated exhaust gases to the desired temperature *before* being admitted to the calcining chamber proper. If the calcining gases are pretempered to, say, 2,200 degrees F., it is then impossible to heat even the fine material above this temperature, whereas in standard practice this fine material is probably heated to around 2,700 degrees. Due in part to this feature, the quality of the lime produced in this unit is definitely superior from many standpoints to that produced in either standard shaft kilns or rotary kilns. This has been definitely determined, since the identical blend of rock being used in these units from the same quarry is being burned at the present time in two rotary kilns of 6 feet and 8 feet in diameter and 125 feet long, and also in three 8-foot inside-diameter shaft kilns, and comparative tests of lime from each type of calciner are consequently made.

The kiln was designed as a vertical direct heat-transfer unit because, whenever material consisting of massed particles is to be heated, one of the most efficient methods of heat transfer is to conduct hot gases directly through the mass of the material. In this way the body of the material acts largely as a heat filter and, because of the extensive total surface exposed to the gases in their travel through the irregular and sinuous passages, the heat is rapidly transferred from the gases to the material. However, in most vertical kilns it has not been possible to treat small-size stone of, say, under 2-inch size, without resorting to the use of an excessively-high draft, which would make the processing cost too high to be feasible. This is due to the fact that masses of material in themselves tend to become packed and cause a high resistance to the flow of gas. As can be seen in the cross-section sketch (Figure 4), this new calciner includes a plurality of baffles which also act as weight-supporting members, and are designed to keep the material in the calcining chamber, as it passes through the kiln, in a very loose condition, which allows the gases to pass through the mass of material without undue resistance. The use of these baffles, properly spaced, makes possible the direct heat-treatment of granular material down to less than ¼ inch in size without the necessity of using an excessively-high draft.

When hot gases are fired into a chamber filled with granular or lump material, even though firing from many separate points which are relatively close together, it is impossible to force the same quantity of heat to all points in the mass of material throughout any given horizontal cross-sectional area of the chamber. This is so because some sections in the chamber are farther away from the points of heat entry than others and the heat tends to rise vertically in the mass rather than penetrate horizontally. Also, the quantity of heat entering at the various firing points may not be identical. In addition to this, even though the same quantity of heat may arrive at two given points in the mass of material the actual heat *available* for calcination at the same two points may vary considerably. As an example, one point may be located well within the mass of material while the other one is located adjacent to the chamber side wall which is a heat-radiating surface. Part of the actual quantity of heat arriving at this second point will pass into the chamber side wall and be radiated, thereby leaving less actual heat available for calcining at this point as compared with the first point. Both these conditions make it practically impossible to maintain the same quantity of *available* heat throughout a calcining zone.

If, under these conditions, the mass of material is moving down through the calcining zone at a uniform rate, then that part of the mass passing through a section of the calcining zone where there is less than the average amount of heat available will be under-treated and, conversely, that part of the mass passing through a section where there is more than the average amount of heat available will be over-treated.

In order to overcome these conditions two rather unusual features were incorporated in the design of the Ellernan unit. First, the hot calcining gases are admitted into the calcining chamber

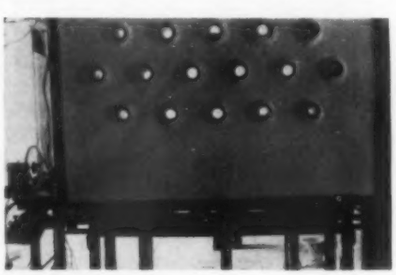


Figure 6—View of the heat-proof-glass observation ports through which the flow of material throughout the calcining zone may be watched while the unit is in operation.

under all the tunnel beams in the two top layers (see Figure 4) and pass into the stone mass along the full length of each beam. As the stone moves down through the calcining chamber, that portion of it which is closest to the source of heat in passing the top layer of beams is farthest away from the source of heat when passing the second layer of beams. Because of this stirring action, together with the fact that firing is done at two separate horizontal series of points, all the stone, after passing both layers of firing beams, has been approximately the same average distance from the source of heat. Second, a new type of discharge mechanism was designed, and this discharge mechanism

is really one of the most important features of the calcining unit. It is of such design that the flow through each section of the chamber may be varied independently from that in any other section; also, the flow through any particular section can be varied within that section so that the material moves down uniformly throughout the section, or faster in one end of the section than in the other end, or faster in the center of the section than it does at either end. With the use of this discharge mechanism it is possible to balance the flow of material from each point in the kiln against the heat available at that point. In this way burning conditions are made uniform and a high quality uniformly calcined material is produced.

Kiln Operations.—The general operation of the calciner is given in the following brief description of the flow of gases and material, which may be more easily understood by a study of Figures 2 and 4:

The combustion and tempering chamber shown in Figure 2 is outside the calciner proper and is fired with two oil burners, one located at each end. The tempered gases enter the calcining chamber proper through many relatively-small openings in the side wall between the combustion chamber and the calcining chamber.

These openings are just below the ends of the transverse beams which span the width of the calcining chamber and are shown in section in Figure 4. The gases pass into the mass of stone through the exposed stone surfaces under the beams; they then pass up through the mass of stone, which is slowly but constantly moving down. The hot gases are admitted under the beams in the two top layers. The gases in passing up through the mass of stone calcine and then pre-heat and are finally discharged from the surface of the stone into the hood chamber, which is located around the feed spouts between the top of the brick work and the bottom of the feed hopper. From the hood chamber the gases are withdrawn from a central point through a pipe by means of an exhaust fan.

The counter flow of rock down through the calciner is controlled by the multi-variable discharge mechanism at the bottom of the cooling section.

This unit, which was not a modification of existing methods, but a new design made specifically for burning lime will find many other uses for heat-treating other types of material. It is felt that this calciner very well meets both the simplicity of operation of a rotary kiln and the heat efficiency of the shaft kiln, and to a large extent can be made to fulfill the requirements of both the small producer and the large producer of lime products.

Lime Association Arranges Program for Convention at Hot Springs May 26-28

Removal of the diplomatic, consular and other representatives of the Japanese government who had been temporarily interned at The Homestead, Hot Springs, Virginia, since the outbreak of war has made it possible for The National Lime Association to go ahead with plans for its convention at the resort on May 26, 27 and 28.

The association has this to say about its coming convention:

"Your Board of Directors already has authorized an extensive research program on chemical lime by Arthur D. Little, Inc., Cambridge, Massachusetts. In a paper to be presented at the convention, R. W. McAllister of that company will outline the program and its significance in industrial application. It is believed that the use of lime in many chemical industries may be expanded, in the light of recently acquired knowledge of lime, and new uses developed. A much needed study on properties of mortar at the Bureau of Standards has been authorized and plans for this new work also should be ready for approval.

"Quite a few years have passed since we have heard from Charles P. Hoover, author of 'Water Supply and Treatment.' In addition to being an author he is now an outstanding waterworks engineer, and he has consented to report to us on the new developments in this field. He is engineering lime into this expanding market every day and this will be your opportunity to check your product with his recommended requirements and standards.

"Messrs. Voss and Staley will report on their work at Massachusetts Institute of Technology. Incidentally, the two-year test results on concrete with additions of lime will be ready and will be analyzed by them. Over 2,000,000 tons of lime per year might be needed in this field. Here is one possibility for post-war planning and careful consideration should be given this subject at the coming meeting.

"Dr. A. R. Midgley of the Vermont Agricultural Experiment Station will present a paper on 'Efficient Use of Lime on the Dairy Farm.' Producers will no doubt recall that Dr. Midgley has done some original work on the use of lime on manure to retard the liberation of ammonia. This has opened up a wide market for lime in the dairy industry and will be an interesting and timely subject. Dr. Wilbur Nelson, Administrator of Preference Rating Order P-56, will talk on priorities and will consult with us on this important phase of industry operations under the war program.

"Other speakers will be on the program and opportunity given for sports, social activities, etc. Committee C-7 of the American Society for Testing Materials has called a special meeting for Tuesday evening, May 26, and many will want to attend. Plan now to attend the convention and join with others in the industry in this instructive and worthwhile program."

Pidgeon Process for Producing Magnesium

To the Editor:

Can you give me any information about the Pidgeon process for making magnesium out of dolomite?—T.C.T.

The process for the reduction of metallic magnesium was invented by Dr. L. M. Pidgeon, Division of Chemistry, National Research Council, Ottawa, Canada. In general the process involves the reaction between calcined dolomite and ferrosilicon. The reaction is carried out *in vacuo* in retorts of special design. Under these conditions the magnesium vapor distills to the cold end of the retort and is condensed there in crystalline form. The condensate is exceedingly pure. Other advantages of the process are said to be:

(a) Safety. Since it is a batch process only small amounts of magnesium are handled at any given point.

(b) Since fuel firing may be employed the process uses about one-half of the electrical energy required by the electrolytic process. This power used is a.c. and does not require rectification as in the electrolytic process.

(c) Aside from the use of vacuum, no new technique is involved. The process involves the established practice of the lime industry and, to a limited extent, that of the zinc industry.

It is understood that the rights under Dr. Pidgeon's patents have been vested in a company under control of the Canadian government, which is erecting a plant for the recovery of magnesium from dolomite near Renfrew in Ontario. Several American companies —the American Metals Company, the National Lead Company and the Permanente Metals Corporation — are building plants to utilize this process under the War Production Board. Further information—but no technical details — can be obtained from W. S. Hegsworth, vice-president, Dominion Magnesium, Ltd., Room 606, National Building, Ottawa, Canada.—EDITOR.

Pennsylvania Lime Maker Expands Plant to Care for Growing Demand for Agricultural Products

THE history of the New Enterprise Stone & Lime Company of New Enterprise, Pennsylvania, is an interesting story of adaptability to changing conditions. Since its formation in 1920 this company has expanded steadily and from time to time new products have been added as the need for them arose. As a result this company's operations are now much more extensive than one would expect in a section of south central Pennsylvania which has few large industries or centers of population.

The company began with a small crushed-stone and lime plant at Waterside, Pennsylvania. Several years afterward a crushed-stone plant at Roaring Springs was purchased and a sand plant at Everett was later added. In 1934 a plant at Ashcom was purchased from the Everett-Saxtan Company and this is now the company's largest operation. It is with the Ashcom operations that this article is chiefly concerned.

The Waterside plant is now used only for the production of ground burned lime which is sold chiefly for agricultural purposes. Its output is about 3,000 tons annually.

The Everett sand plant was enlarged about 10 years ago to its present capacity of 30 tons per hour. It produces a white sand which is sold over a wide area for plaster work.

The Roaring Springs plant was rebuilt in 1941 and now has a capacity of 80 tons per hour of crushed stone. In 1940 a new amiesite plant was built and earlier a batching plant for ready-mixed concrete was erected.

The kilns and crushing plant at Ashkom as seen from the Turnpike.

The Ashcom operations, when taken over, consisted of a 60-ton per hour crushed-stone plant, a 3-kiln lime plant with a hydrating department, and a 1-ton per hour agricultural-limestone mill. In 1939 and 1940 the capacity of the crushing-and-screening plant was increased to 100 tons per hour to take care of the demand created by the construction of the Pennsylvania Turnpike. Practically all the equipment in this plant except the primary crusher and the revolving scalping screen was installed at that time.

At the same time equipment for dry-batching aggregates for the Turnpike was put in service. This and cement-batching facilities are now used for the production of ready-mixed concrete for which there is a moderate demand. The Butler cement-batching plant consists of a bucket-elevator, a bin and a batcher. The Blaw-Knox aggregate-batching plant is a dual installation which was designed to serve dual-drum pavers. It consists of an elevator, bins and two weighing batchers. The original 3-cubic yard Smith truck-mixer was purchased in 1941 and a 2-cubic yard machine of the same make was added early this year. These trucks are also used at Roaring Springs when needed there.

The demand for agricultural limestone has increased rapidly in recent years and the capacity of this plant has

A view in the quarry showing the inclination of the deposit and some of the equipment. The view at the right was taken from the top of the face and shows a wagon-drill at work.

been expanded several times. In 1941 the original small tube-mill was replaced by a Hardinge conical mill of much greater capacity. On February 11, 1942, the output of this mill was supplemented by that of a new Bradley Junior Hercules mill. A second Junior Hercules machine of the latest type will go into operation about May 1. The company holds a 25,000-ton government contract for 8 counties. The output of agricultural limestone in 1942 is expected to be three or four times the 12,000-ton output of 1941.

The deposit is a fairly-massive magnesium limestone in 12- to 18-foot layers which some past upheaval of the earth's surface had tilted at an angle of about 45 degrees. As is usually the case

The 4-ton locomotive "spotting" cars at the primary crusher.

with a deposit of this kind, the surface is very irregular and the overburden, which is quite heavy, is badly pocketed. Most of the stripping is done by an International tractor and a Bucyrus-Erie 4½-cubic yard scraper. A Caterpillar D8 tractor and a Le Tourneau 12-cubic yard scraper are also used for this work. This equipment is used at the company's other plants, too, when needed. One of the ¾-cubic yard Northwest gasoline shovels used at this plant can

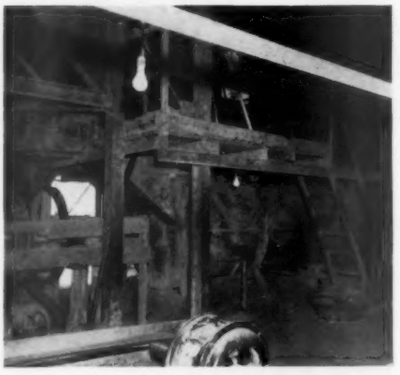
The 3-foot reduction crusher.

be equipped with a back-hoe whenever a deep pocket is encountered.

The drilling and blasting of such a deposit are usually quite a problem and here they are being done in an original manner. A wagon-drill has been equipped with an air-operated hoist, which is attached to a cable anchored at the top of the face and moves the drill up or down as desired. Rows of 30 holes are drilled vertically up the 150-foot inclined face and the shots slice off vertical strips of rock which slide down to the bottom for loading. When a new ledge is to be started, an opening shot is made in a vertical row near the middle of the face. Then rows of holes are drilled on each side so as to converge almost to a point at the quarry floor. After these are loaded and detonated the usual vertical or parallel rows are drilled. Large stone is broken up by a Frog, Switch & Manufacturing Company skull cracker operated by an old Byers crane. All the air used in the quarry and the plant is supplied by an Ingersoll-Rand Model 40 air-cooled compressor.

The stone for the crushing and pulverizing plants is loaded by a small Northwest gasoline shovel, which was purchased in 1940, and an old steam shovel. The latter is to be replaced by a 1½-cubic yard Northwest crawler shovel with a Murphy Diesel engine on which delivery is expected in June. Two International trucks haul the stone a distance of a few hundred feet and discharge it from a ramp into 3-ton steel cars. A 4-ton Vulcan gasoline locomotive hauls trains of 6 cars a distance of about ½ mile to the crushing plant. The tracks pass through a tunnel under the hill and through a viaduct under the Pennsylvania Turnpike, which is between the quarry and the plants.

The stone for the lime plant is usually obtained from selected points at the end of the quarry where the stone has a 3-per cent. magnesia content and is loaded by hand into small side-dump cars. These are hauled in trains of two cars each by a small gasoline locomotive and on the same track through the tunnel and viaduct to a side-track leading to the lime kilns. The cars are hoisted one at a time up the incline to discharge into the three Kuntz vertical kilns. These have an interior diameter of 8 feet and are 25 feet high above the firing doors. They are coal- and wood-fired and the lime is drawn every 6 hours. Each kiln has a Kuntz conical-bottom cooling chamber and clam-shell-type ventilated draw gates. An inclined stationary screen under each kiln re-



The rebuilt hydrator viewed from the feed end.

moves the fines, which are sold to farmers for agricultural purposes.

The lump lime is then picked over and dumped into a new McLanahan & Stone 24- by 24-inch slugger-roll crusher. A bucket-elevator discharges the crusher product into the hydrator-feed bin. The original McGann Schulthess hydrator was converted to the Kuntz system in 1938, nearly doubling its former 2-ton per hour capacity.

The hydrated lime is elevated to the first of two 6-foot Sturtevant mechanical separators which make a chemical lime, 98-per cent. of which will pass through a 400-mesh sieve. A screw-conveyor discharges this product into a bin over a Bates Packer. The coarser hydrate passes from the first separator

The pulverizing building with drier in the foreground.

to the second one, which makes a 98-per cent. through 200-mesh agricultural and refractory lime. A screw-conveyor discharges this product into a bin over a second packer. Most of the output is sold for use in the manufacture of refractories.

At the crushed-stone plant the cars are hauled over a trestle, from which their contents are discharged into the Number 8 Austin gyratory primary crusher. A belt-conveyor feeds the crushed stone to a revolving screen from which the oversize is carried on a belt-conveyor to an 18 by 36-inch McLanahan & Stone roll-crusher, whose product is discharged on the first belt-conveyor and again goes through the revolving screen.

Cone-type cooling chamber, clam-shell draw gates and stationary screen under one of the kilns.

The finer rock passing through this screen is conveyed to a 35-foot McLanahan & Stone log-washer which was installed in 1940. The washed stone goes to a 4- by 10-foot Telsmith 2-deck vibrating screen which is equipped with washing sprays. This makes three fine sizes of stone which are discharged into bins. The overflow of the washer goes to a settling pond from which the ¾-cubic yard Northwest gasoline shovel used for stripping occasionally removes the settlings.

The rock passing through the larger openings in the revolving screen is discharged into a 3-foot Telsmith Gyrasphere reduction crusher. A bucket-elevator feeds the stone from the crusher to a pair of 3- by 10-foot Telsmith 2-deck vibrating screens, which make three sizes of crushed stone that are discharged into bins for truck-loading. The cloth on these screens can be changed without shutting down the plant by diverting the flow to one screen while the other is being changed and *vice versa*. The oversize material from these screens is returned by gravity to the Gyrasphere crusher.

Conical mill used for fine pulverizing. Table-feeder at left.

The stone for the pulverizing plant is hauled in trucks from the bins. For the Hardinge mill ⅜-inch stone is used and for the Bradley Hercules mill ½- to 1½-inch stone. These materials are handled separately to the feed bins over these mills. If the stone is damp it is discharged from the trucks into a short bucket-elevator feeding a 4- by 20-foot McGann indirect-heat rotary drier. This drier is wood-fired but it is to be converted to direct-firing with oil in order to increase its capacity. The locust mill waste now used as fuel costs about $1.60 a cord, which is said to give about as much heat as a ton of local $3.50 coal.

When the stone is dry it is discharged direct from the trucks into the same bucket-elevator which takes the product of the drier. From this elevator it is discharged into a 2-compartment 100-ton bin.

Loop classifier which is connected to the conical mill.

The ⅜-inch stone is discharged from one compartment to the table-feeder of the 6-foot by 36-inch Hardinge conical mill. A Hardinge "electric ear" automatically regulates the feed to the mill to give the best grinding efficiency. The mill is equipped with a No. 45 Hardinge loop classifier. Its product goes to an 8-foot cyclone from which the coarse material is returned to the mill. When mine dust is being made, this fine product is discharged from the cyclone into a bin over a 2-spout Bates packer. This product is ground to a fineness of 90 per cent. through 100-mesh, and to a fineness of 100 per cent. through 50-mesh at the rate of 2½ tons per hour. The Hardinge mill circuit is connected to a Pangborn bag-type dust-collector.

One of the two mechanical separators in hydrating department.

When agricultural limestone is being made the products of the Hardinge mill

Three sizes of washed stone are separated by this screen.

and the Hercules mill are discharged simultaneously into a bin over a second 2-spout Bates packer. In this case the Hardinge mill produces 3 tons per hour of material passing 80 per cent. through 100-mesh, 90 per cent. through 60-mesh and 100 per cent. through 20-mesh. This material is combined with the 7-ton per hour output of the Hercules mill to make a product exceeding government specifications.

The table-feeder of the Bradley Hercules Junior mill is automatically regulated by the load on its drive motor in order to keep the fineness of its product uniform and to keep the mill operating at its maximum efficiency. It is driven by a 100-horsepower General Electric motor.

Most of the main equipment in the Roaring Springs plant is new. The stone goes first to a 36- by 48-inch Farrel Bacon jaw crusher which is followed by the scalping screen. A 12-inch Telsmith gyratory crusher is used to reduce the oversize material. The coarse sizing is done by a 4- by 10-foot Telsmith 2-deck vibrating screen and further reduction is made by a 3-foot Telsmith Gyrasphere crusher. Two 4- by 8-foot Telsmith screens are used for final sizing. Gates V-belt drives predominate in this plant as well as in the Ashcom plant.

This 35-foot log-washer removes all dirt from the stone.

Marble Cliff (from page 54)

tually feeds the lump lime into a prehydrator which consists of an old screw-conveyor with paddles in place of flights, and where water is added. The partially-hydrated lime is then discharged into the hydrator, wherein the hydrated lime continuously overflows the discharge cylinder. About once a week the cylinder is raised and the core, which has settled in the bottom, is plowed out.

Drive of the 14-foot mechanical separator. Feed screw-conveyor and elevator at right.

The hydrated lime is discharged into a 12-inch Jeffrey screw-conveyor and a 72-foot Jeffrey bucket-elevator feeds it to the 14-foot Raymond mechanical separator which is equipped with a single whizzer. The fine Number 1 product (99.9 per cent. through 400-mesh) is carried by a screw-conveyor to a 90-ton bin over a 2-spout St. Regis bag-packer.

One of the trucks fitted with a low-slung 6-ton steel hydraulic-dump body.

The rejects from the separator are discharged into a bin over a Raymond automatic pulverizer which is equipped with a 5½-foot dual whizzer separator. The feeder to this mill is driven through an Allis-Chalmers variable-speed drive. The product of the mill goes to a Raymond 7-foot cyclone separator and into a 90-ton bin over another 2-spout St. Regis packer. This Number 2 hydrate has a fineness of about 99.9 per cent. through 200-mesh.

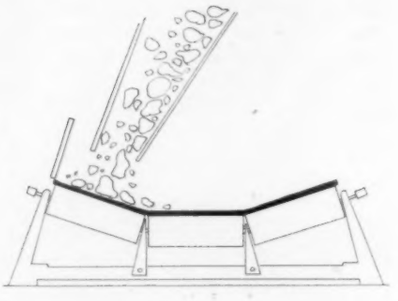
The rejects from this mill circuit are carried by a screw-conveyor under the floor to an elevator and into a bin for subsequent hauling to waste.

The entire new section of the plant is kept as nearly dustless as possible by a Norblo 15-foot bag-type dust-collector. This is connected by hoods to the loading point of the picking conveyor, the elevators, the discharge ends of the belt-conveyors, the crusher, the kiln draw points and the screens. About 2 tons of dust is reclaimed in 24 hours and this is carried by a screw-conveyor to the hydrator-feed bin.

The "meal" or agricultural limestone plant is located at the stock-piles some distance from the main plant and can be fed direct from them or from the plant by trucks. An elevator feeds the stone into a Heltzel bin from which a Jeffrey-Traylor vibrating feeder carries it to the 10-ton per hour Jeffrey hammer-mill. A short belt-conveyor feeds the finished product to a Jeffrey whirley-mounted portable belt-conveyor for discharge to the finished-material stock-piles.

Saving Wear on Belting

Conveyor belts are expensive equipment about a mine or quarry, thus any means employed to lengthen their period of service will lower operating costs appreciably. For obvious reasons conveyor belts wear on one side and it serves no good purpose to turn them over since the point of wear is still in the center where the fabric is already thin from wear. However, any means that will distribute the wear over a larger area will also lengthen the period of usefulness. We have learned that by placing the chutes in such a position that the material will strike on either side away from the center (the point of contact is the place of greatest wear) the belt can then be turned over



180 degrees and the wear comes in the section still unused. The attached drawing indicates how this is accomplished by arranging the chute to discharge to one side, but for purposes of clarity the wing baffle which later distributes the load to the center is left out.—(P. C. Ziemke, *Milwaukee*).

View from quarry showing incline and plant.

Agstone Output Increased from 3,000 to 20,000 Tons in Year

THE firm of Yoch & Roberts, Norristown, Pennsylvania, of which C. R. Roberts is the sole surviving partner, operates a small crushed-stone plant on the outskirts of that city. Formed in 1919 for the production of fluxing stone, this firm began to produce crushed stone in 1925.

In 1927 a cold-mix asphalt plant was built on the property and this is now leased to the Bitu-Rock Company. In 1936 ground was leased to the Llanerch Ready-Mixed Concrete Company. In the same year a Traylor Type TY gyratory crusher was installed for the production of agricultural limestone. This business did so well that a Bradley Junior Hercules mill was added early in 1940. The output of this material was only 3,000 tons in that year but in 1941 the exclusive Government contract for five counties was obtained and the output jumped to over 20,000 tons.

Grinding mill which reduces 1-inch stone to dust.

The specifications in this area require that all the material must pass a 20-mesh screen and contain at least 50 per cent. oxides. For every 1 per cent. of oxides over the 50-per cent. minimum 2 per cent. less minus-20-mesh material is required. The company guarantees that all its product will pass through a 20-mesh screen and will exceed 85 per cent. through 60-mesh and 80 per cent. through 100-mesh. The total oxide minimum guaranteed is 51.4 per cent. and the total of carbonates exceeds 98.4 per cent.

Because the ledges in the quarry are tilted at about 45 degrees, jack-hammers are used for primary drilling in 18- to 20-foot benches. Very little secondary shooting is necessary. The loading has always been done by hand and horses originally pulled the cars to and from the foot of the incline. Early in 1940 this equipment was replaced by a Brooks Load Lugger, mounted on an International truck chassis, and ten 1-cubic yard buckets. Eight men load the buckets on a piece-work basis and the Load Lugger hauls them a few hundred feet to the incline. Two buckets are used for waste and 8 for stone. In 9 hours these men load about 200 buckets. On the day the writer visited these operations late in 1941 a new record total of 205 cars was loaded.

The stone is discharged from the buckets into a 1½-cubic yard car which is hauled up the incline to the plant. A Number 6 Good Roads "Champion" jaw crusher, a Number 4½ Traylor gyratory crusher, and a revolving screen are used to make several sizes of crushed stone.

Gyratory crusher which makes commercial stone.

The minus-1-inch stone for the pulverizing plant is hauled up a ramp by a truck from which it is discharged into a 30-ton bin over the Bradley Junior Hercules mill. This machine is equipped with an automatic table-feeder and has a 12-mesh screen on the bottom and a 16-mesh screen on the top. A screw-conveyor followed by a bucket-elevator feeds the pulverized limestone into a 117-ton Blaw-Knox steel bin. Trucks are loaded under this

Detachable-bucket truck discharging quarry stone to car at incline.

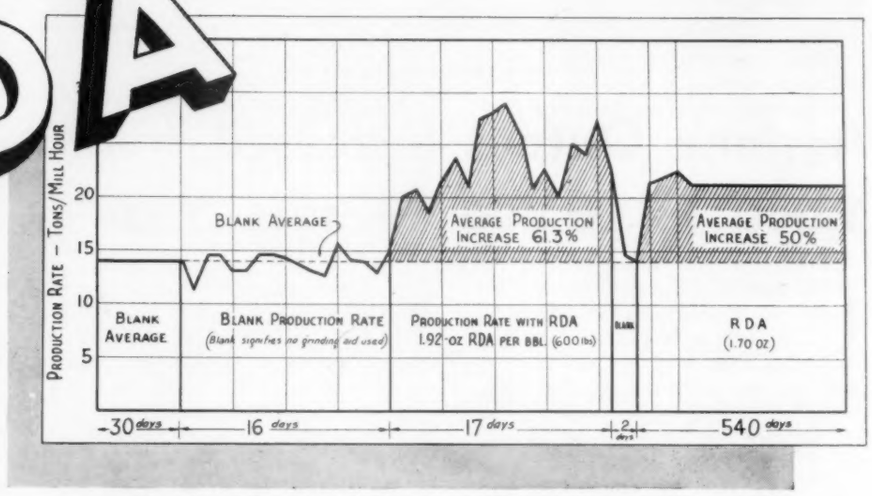
TDA EXPERIENCE

POINTS A WAY FOR

ROCK PRODUCTS MANUFACTURERS

to get more production from present grinding equipment with

RDA



Results of Raw Metal Grind in a Western Cement Mill
(Dry process plant)

RDA is a companion product of TDA—the catalyst-dispersing agent—grinding aid now being extensively used in the Portland Cement Industry. It was developed to meet the needs of grinders of rock products when the catalytic agent of TDA is not required. And in times like the present when production is vital and the need to conserve power urgent, the grinding efficiency effected by RDA suggests new uses for it in fields we do not now serve.

We don't claim that the dispersing agent—RDA when used as a grinding aid for Rock Products will increase production with every material. We haven't had the chance or the time to do it. But, we do claim that RDA is being used successfully in many cement mills for grinding raw materials and showing production increases of from 15% to 90%. Maybe RDA won't do this for your product, but isn't it worth a trial?

Here's what one mill is getting with RDA grinding cement rock. From the above chart note the marked increase in grinding mill production rate immediately upon adding RDA. Likewise note the abrupt decrease when the RDA addition was stopped. Here was an increase of production rate of 50% obtained by using only 1.70 ounces of RDA solids per 600 pounds of raw material. (Current price of RDA in liquid form is 3½c/lb. f.o.b. Chicago.)

In addition, the use of RDA by cement manufacturers has given other advantages which of themselves may be valuable to your product.

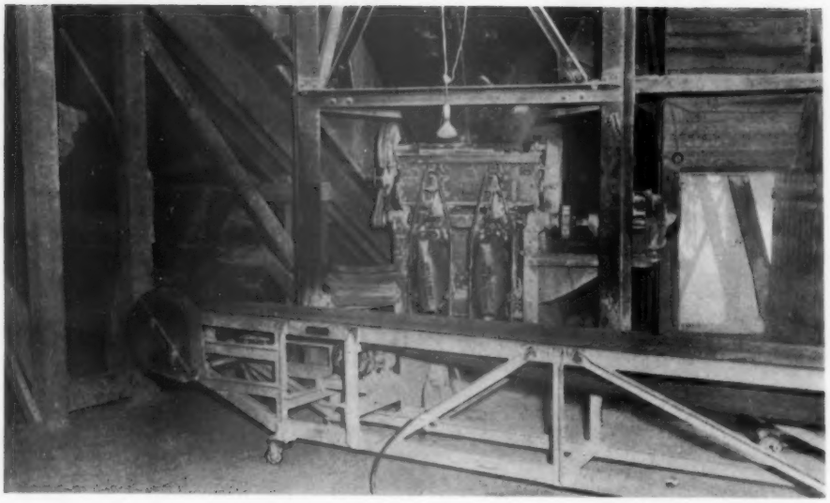
1. Permits balanced plant operation.
2. More uniform particle size freer from extreme fines or oversize particles.
3. Improves air separator efficiency.
4. More uniform kiln feed. Five to eight percent increase in kiln production,
5. Reduces stack losses due to lack of extreme fines.
6. Finished clinker easier to grind.

Based on what RDA is already doing for the raw grinding of cement mills we believe it has utility for the grinding of lime, limestone, feldspar, talc and other rock products. Since it takes no expensive equipment to try RDA, isn't it worth investigating *today* when production is so important.

TRY RDA FOR GRINDING
LIMESTONE
FELDSPAR
LIME
TALC

TDA *The accepted Grinding Aid* FOR PORTLAND CEMENT
RDA FOR OTHER ROCK PRODUCTS

DEWEY AND ALMY CHEMICAL COMPANY
CAMBRIDGE CHICAGO OAKLAND



Sacking machine for agricultural stone and portable conveyor which carries the loaded bags.

bin from which a screw-conveyor can also feed into a bin over a St. Regis 2-bag packer. A Haslett Chute & Conveyor Company portable conveyor is used to load the bags into trucks. This department produces 9 tons of agricultural limestone hourly.

The same trucks also haul some of this stone into a ground-level hopper from which another elevator transfers it into a bin over the Traylor 1-foot 8-

Scale, originally installed in 1925, which was recently rebuilt.

inch Type TY gyratory crusher. The minus-⅜-inch product of this crusher is elevated to a Link-Belt 2-deck vibrating screen. The stone passing over the top deck goes to an Ajax shaker screen which makes tailings and ½-inch stone. That passing over the bottom deck is ⅛-inch stone and that falling through the bottom deck is agricultural limestone. All go to separate bin compartments. The tailings are taken back to the crusher. The ½-inch stone is trucked to the Bradley mill or is used in the black-top plant. The pulverizing plant has a capacity of about 20 tons per hour of which 3 tons is agricultural limestone.

All deliveries are made by the company's fleet of seven Mack and International dump trucks which are used for both sacked and bulk materials. Deliveries have been made to points 60 miles away, but most of them are made within a much smaller radius.

All shipments are weighed on a Howe 18,000-pound capacity truck scale which was installed about 1925. Early in 1941 this scale was overhauled and equipped with new knives, bearings, planks, etc.

Stock-piles of aggregates are maintained and trucks are loaded by three Link-Belt stock-pile loaders.

Investigation Reveals Damage from Blasting

Sensitive instruments developed by the Bureau of Mines to measure the destructive force of air-blasts caused by the detonation of high explosives in mines and quarries are also applicable to the immediate wartime problem of damage from demolition bombs and other military explosives, according to Dr. R. R. Sayers, Director of the Bureau. The results of seven years of technical investigations of ground-vibration and air-blast pressure are now available to quarry and mine operators.

The latest method of measuring detonating forces originated and tested by the Bureau of Mines is a dual channel high-speed cathode ray recording system which, with its delicate instruments, can measure time increments as low as 20 millionths of a second, and can obtain written records at 15,000 inches per second of a blast's advance.

This super-sensitive recording system measures the pressure—in pounds per square inch—that is thrown against a building or other object by high explosives at varying distances, and indicates exactly the degree of force necessary to destroy windows and buildings which might be within range of the detonating force. It will also record the amount of air-blast that is reflected, or "bounced" from one building to another following an explosion.

Experiments with the Bureau's cathode-ray instrument reveal that the main air-blast disturbance caused by the detonation of high explosives is composed of a positive pulse, or outward pressure, lasting a few thousandths of a second, which rises quickly to a maximum and then drops off more slowly. The outward pressure then is followed by a negative pulse, or vacuum, of longer duration which also exerts a force on the building or object within range of the detonation. These facts coincide with descriptions of the behavior of demolition bombs given by experts who have studied this subject under wartime conditions in Europe.

Because a large number of open quarries and blasting operations are located near residential districts and the problem of property damage is of great concern to operators, explosives men, and the general public, the Bureau of Mines in 1935 began a study of ground vibrations caused by blasting operations. Early investigations employed microphones placed near arranged shots of explosives, recording of pressure from gas explosions, and the use of crystal elements in the apparatus. Window-glass failure was tested with varying charges of high explosives, and pressure measurements were taken for distances up to 17,000 feet—over three miles.

Development of the highly-specialized recording equipment and the extensive experience acquired by Bureau scientists in the period 1935-40 provided a background for the cathode-ray experiments and the air-blast developments of 1940-1941. By means of the tables and charts complied in the last two years, users of industrial explosives may limit and control the extent of air-blast damage resulting from detonations in mines and quarries. A given amount of a certain type of high explosive will project its blasting force according to the Bureau's carefully prepared formulas, and this information no doubt will provide increased safety for industrial workers and result in less property damage from broken windows and shattered structures.

The Bureau's experiments also are expected to be utilized to a considerable extent by military explosives experts, both in the manufacture of bombs, and in the planning of protective devices for civilian and military populations.

Methods of recording air-blast damage, together with a summary of early experiments and results, are described in Report of Investigations No. 3622, *Damage From Air-Blast,* by S. L. Windes, associate seismologic observer, published by the Bureau of Mines.

Kelley Island Adds Second Rotary to Double Kiln Capacity at Clay Center

THE Kelley Island Lime & Transport Company late in 1933 put in operation at Clay Center, Ohio, what was then and still is one of the best of the plants producing refractory-burned dolomite. This plant, which was completely described in the June, 1935 issue of PIT AND QUARRY, was designed so that it could be used for the production of lime, if this ever became desirable, and space was left for a second rotary kiln and its related equipment. It never became necessary to use this kiln for lime production but in recent years the demand for "roasted dolomite" increased to such an extent that the installation of the second kiln became imperative. Its installation also insures against delays in deliveries to vital war industries. This kiln went into operation late in March, 1942. The average output of the original kiln in 1941 was about 115 tons daily and the new kiln is expected to average from 160 to 180 tons daily depending on whether high- or low-iron refractory dolomite is produced.

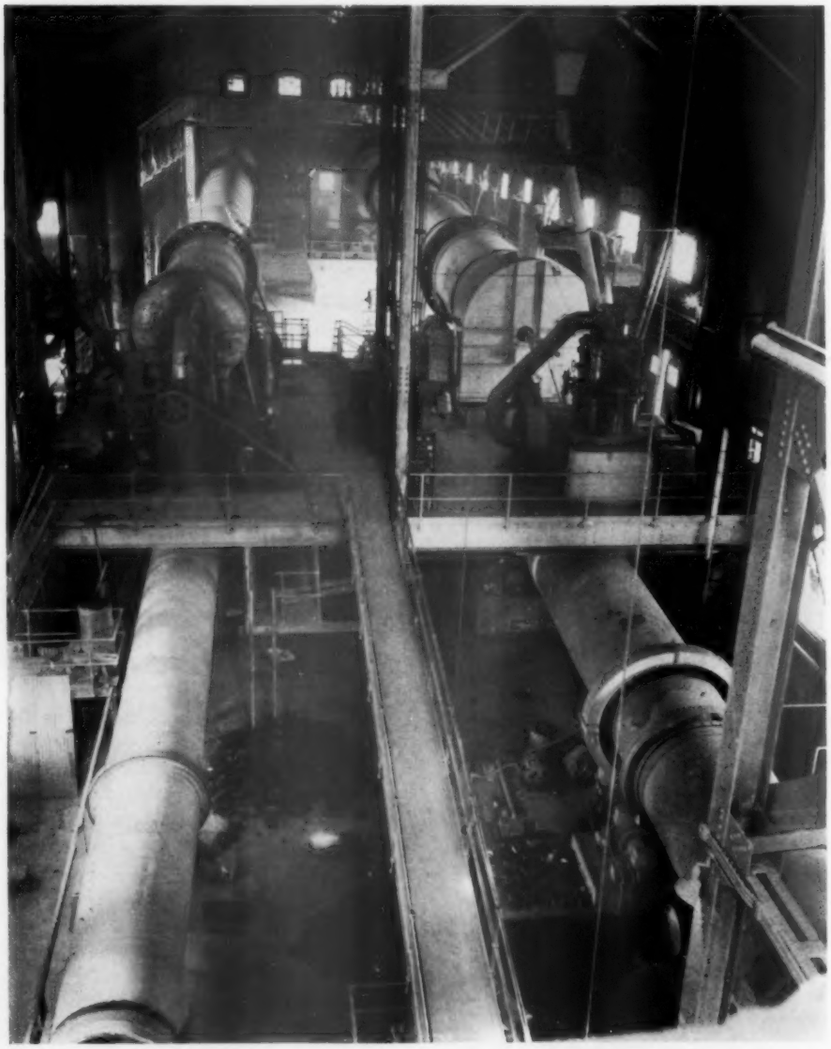
The 4-cubic yard electric shovel loading a train of 6-cubic yard ore cars in the quarry.

This plant is only a part of the operations at Clay Center. The entire operation consists of a central primary-crushing plant; four vertical-kiln plants, known as Plants, B, C, D and E, with a total of 53 vertical kilns and a combined capacity of 500 tons of finishing hydrate daily; a fine-crushing and sizing plant with a capacity of 200 tons per hour of commercial material from 2 inch to 100-mesh size; and the enlarged rotary-kiln plant. A pressure-hydrating department was added early in 1941 to the hydrating building for Lime Plant B which was completed early in 1931 and was described in detail in the earlier article.

The deposit from which all these plants are supplied consists of a dolomite which contains a very small percentage of impurities. Operations are now being conducted on the second 40-foot level in the quarry and a third level of 50 feet will soon be opened. Drilling, blasting and loading are done in the usual manner. Late in January, 1942, a new Bucyrus-Erie 100-B all-electric shovel with Ward-Leonard control and a 4-cubic yard dipper was put in operation to replace one old steam machine. This shovel uses 4,160-volt current and has a completely grounded electrical system. It is operated by induction motors, and static condensers are used to obtain the best possible power factor. Another 1¾-cubic yard steam shovel is still used occasionally. The stone is loaded by the shovel into 6-cubic yard cars which are hauled by steam locomotives to the foot of the plant incline in trains of 6 cars each.

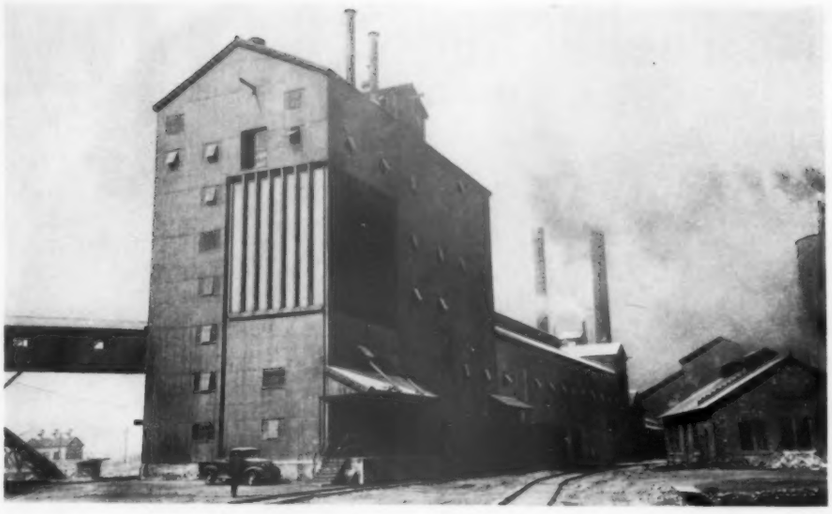
The cars are hoisted two at a time up the incline to the Edison primary roll-crusher. Revolving screens provide three major sizes of stone: 5- to 12-inch for the vertical kilns; 2½- to 5-inch for fluxing stone; and minus-2½-inch for the fine-crushing and screening plant.

The latter plant was completely described in the December 16, 1931 issue of PIT AND QUARRY and only minor



The two 150-foot kilns with their coolers, coal mills, etc., viewed from the discharge ends. The new equipment is at the right.

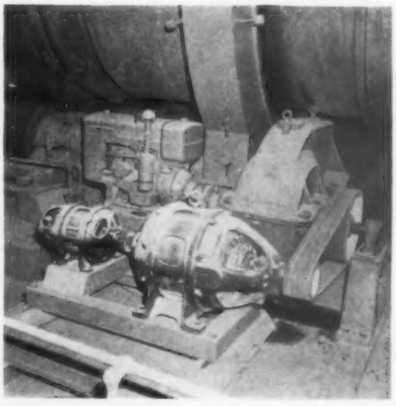
By W. E. TRAUFFER



The Clay Center roasted-dolomite plant.

changes have been made in it since. The stone for this plant is received on a belt-conveyor from the main crushing-plant bins. A second belt-conveyor feeds a single-deck vibrating screen which removes the minus-4-mesh material. Two triple-deck screens in series make other sizes and a 4-foot cone crusher can be used to reduce the larger sizes.

The minus ⅜-inch material, which is feed for the rotary-kiln plant, is diverted to a 7- by 40-foot rotary drier which is fired with coke to prevent discoloration of the stone. The dried fine material is then fed by a bucket-elevator to two triple-deck screens which discharge their various-sized products into storage bins. These screens produce 5-, 10-, and 20-mesh sizes as well as the 5-mesh to ⅜-inch raw dolomite. The 5- and 10-mesh products are sold as ground stone. The minus-20-mesh material goes to two air-separators, one 6 feet and one 8 feet in diameter. The fine dust from these units is sold as agricultural limestone (97 per cent. through 100-mesh) and the rejects go to the 10-mesh material bin. The ⅜-inch to 5-mesh stone retained on the top decks of these two screens is carried on a belt-conveyor to a 100-ton steel bin in the rotary-kiln room.



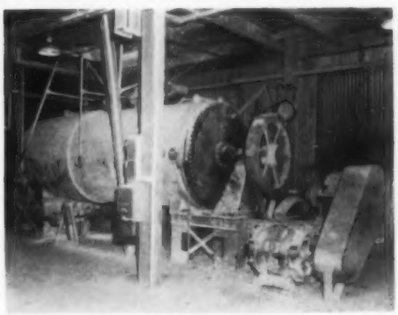
Drive on the new kiln. Generator operating feeder motor at the left.

The mill scale used in the manufacture of the roasted dolomite contains about 70 per cent. of metallic iron. It is received in hopper-bottom cars from rolling mills and is discharged into a track hopper at the plant. A 28-inch by 16½-foot manganese-steel pan-conveyor feeds the scale to a 12-inch bucket-elevator which operates on 72-foot centers and discharges it into a 100-ton steel bin alongside the stone bin.

The original installation consisted of two Schaffer Poidometers with 14-inch belts on 6-foot centers under these bins. These fed a mixture containing about 3½ per cent. of ore to an 8-inch bucket-elevator on 42-foot centers. This discharged the material through a spout into the original 8- by 150-foot rotary kiln.

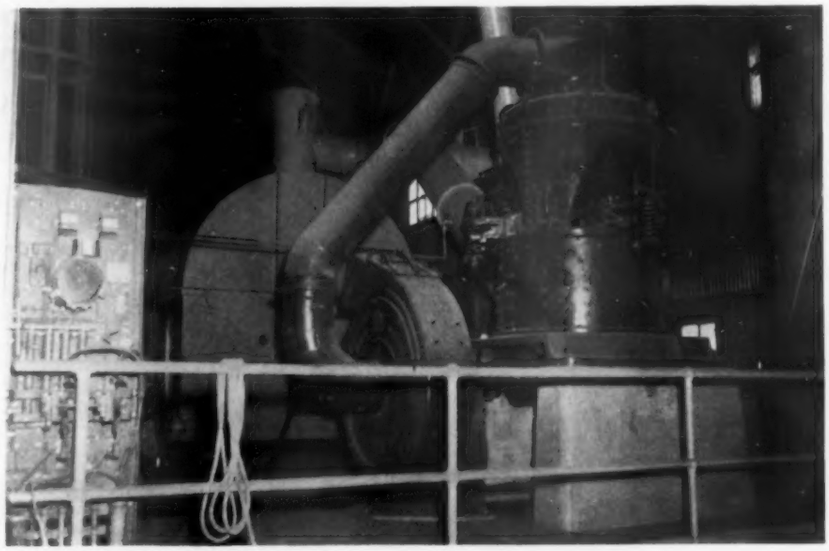
A second pair of Schaeffer Poidometers of the same size feed a mixture of stone and ore to a duplicate bucket-elevator for the new kiln. A 16-inch by 34½-foot belt-conveyor carries this material to the feed spout to the kiln.

The new all-welded Traylor rotary kiln is 10 feet in diameter and 150 feet long. It rides on two sets of rollers and is driven by a 60-horsepower Westinghouse induction motor through Goodyear V-belts and a Falk gear-reducer. The kiln speed can be varied between the limits of 2 and 2½ minutes per revolution. A Selsyn generator or transmitter on the kiln-motor shaft drives the 7½-horsepower receiver motor operating the two Poidometers supplying this kiln at a speed in direct relation to the kiln speed. An International gasoline engine can be used in an emergency to drive the kiln through the high-speed shaft of the gear-reducer.



Pressure hydrator which was designed and built by the company.

The burning of refractory dolomite requires exceedingly high temperatures with the result that the lining in the burning zone of such a kiln is subjected to more severe service than similar lining in a rotary cement or lime kiln. The new kiln has 12 feet of General Refractories "Arco" 70-per cent. alumina brick at its discharge end. The



Direct-firing bowl-mill which serves the new kiln.

UP! LIME PRODUCTION at the Thomasville Stone & Lime Co. 100%

The YORK-KUNTZ patented lime kiln with "continuous-feed continuous-discharge" system is the modern basis for top production and profit figures in the manufacture of high grade lime.
"Y-K" units insure complete control of all operations, eliminate over-burning and under-burning, and show a high lime-fuel ratio.

The Thomasville Stone & Lime Company originally produced 2½ tons of lime per hour on a batch basis from this lime hydrator.

KUNTZ adjustments boosted output to 5 tons per hour, a 100% increase of capacity, and further increases in capacity only limited by the separating system.

KUNTZ also accomplished the entire elimination of dust losses, and the new KUNTZ condenser now recovers an extra 50 pounds per ton of high quality hydrated products, formerly wasted.

KUNTZ builds and engineers complete Hydrate Plants that represent the most modern developments to insure peak operating efficiency.
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EVEN-SPREAD, The Trouble-Free Lime Spreader

Here at last—EVEN-SPREAD—a really successful, simplified spreader for handling fine, dry lime or limestone. Note that EVEN-SPREAD has:

1. No troublesome belt, chain or slat conveyors.
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It's a spreader with a real positive even feed from the bed to a positive even spreading mechanism, insuring extreme accuracy for any rate of application. Write for literature and complete information.

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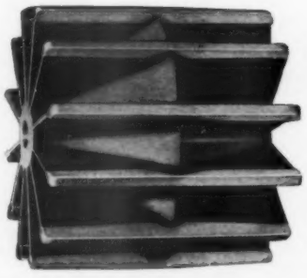

Conserve Rubber-Increase Profits with the "Beltsaver"

Wing Type tail pulley for your elevator or conveyor belts. Many of these belts contain rubber and rubber is important to the nation's Victory Program.

Satisfied users of the "Beltsaver" Pulley report increased belt life from 50 to 100 percent. In addition to saving your rubber or canvas belts, this pulley will increase your profits.

The exclusive design of the "Beltsaver" prevents stones or other abrasive material from lodging between the pulley and belt, thus eliminating excessive wear. These pulleys are interchangeable with standard pulleys. Ask for specifications and prices.

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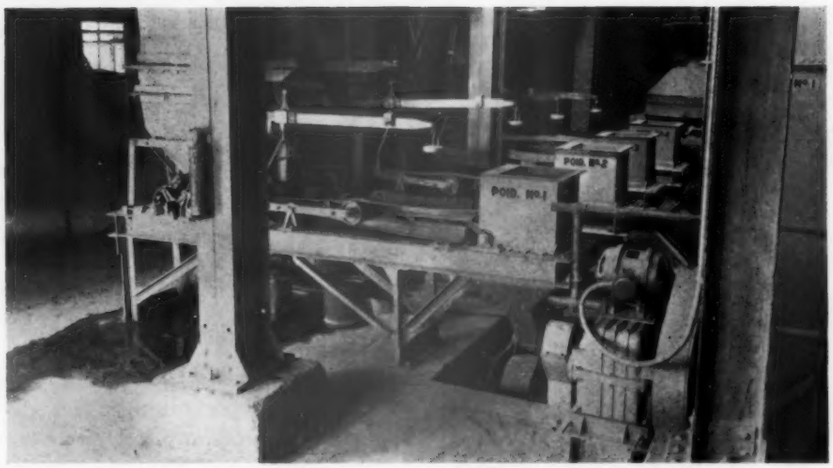


The four automatic weighing feeders which proportion and feed iron and crushed dolomite to the kiln.

burning zone is lined for 35 feet with General Refractories "Ritex" magnesite brick which has proved to be very satisfactory. Next is 28 feet more of "Arco" 70-per cent. brick. The remaining 75 feet of the length of the kiln to the feed end is lined with Harbison-Walker "Webster" hard brick.

The coal for firing both kilns is discharged from hopper-bottom cars into a track hopper, from which a pan-conveyor feeds it to a 12-inch bucket-elevator on 80-foot centers. A 16-inch screw-conveyor 60 feet long carries the coal across the kiln building to a 137-ton bin for the original kiln and its Babcock & Wilcox coal mill. This screw-conveyor has been tapped to discharge into the 125-ton steel bin for the new kiln and mill, and the overflow goes to the original bin.

Ball-mill which reduces the hydrate before it goes to the packers.

The new kiln is fired through a plain tapered-nozzle burner pipe by a Raymond Number 453 direct-firing bowl-mill which has a rated capacity of 100 tons in 24 hours when grinding to a fineness of over 90 per cent. through 200-mesh. The hot air for drying the coal in this mill is drawn through a pipe from the top of the kiln hood. A damper in this pipe is operated by a Brown recording pyrometer which keeps the temperature of the air going into the mill at about 300 degrees F. This instrument is mounted on the kiln-control board with a Hays automatic draft controller, etc. The coal mill is mounted on concrete piers and is high enough above the kiln-floor level to allow access beneath it for adjustments. This mill is driven by a 125-horsepower Westinghouse synchronous motor with an 80-per cent. leading power factor.

The temperature of the gas leaving the kiln is about 1,650 degrees F. A dust chamber settles out part of the dust. The draft through the kiln is controlled by a damper which can be operated manually or automatically as desired. The 7½- by 100-foot steel stack has a self-supporting base and was made to the company's design by the Traylor Engineering & Manufacturing Company.

The roasted dolomite is discharged from the kiln into the 7- by 65-foot Traylor rotary cooler, which is lined with brick for the first 20 feet of its length and has lifter buckets for the the remainder. It is supported on two rings and is driven by a 25-horsepower Westinghouse induction motor through Goodyear V-belts and a Falk reducer at a speed of 3 revolutions per minute. Carbofrax brick has been used in the discharge from the kiln to the cooler where the heat is great and the wear and abrasion extreme.

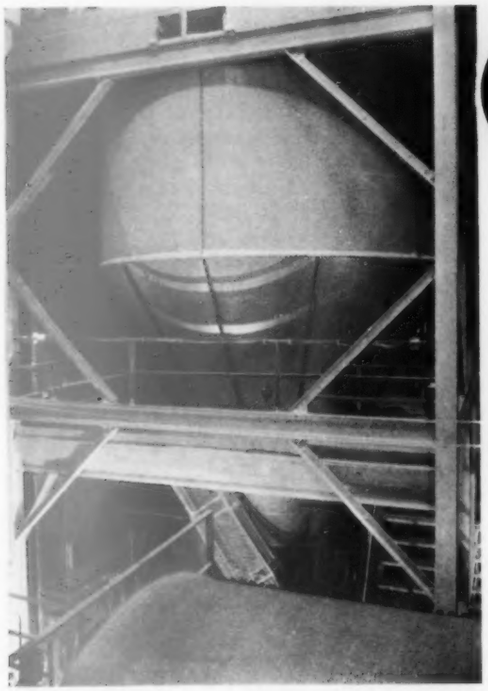
The cooler shell has a 9/16-inch perforated section at its discharge end which removes any oversize and foreign matter. The material passing through these perforations is finished dolomitic refractory and is sprayed with oil as it leaves the cooler to reduce the amount of dust produced in handling. This material is discharged in the bottom flight of the original continuous pivoted-bucket conveyor which also takes the output of the original kiln and cooler. This conveyor has buckets 18 inches wide and was designed to take the output of both kilns. A dividing plate has been installed in each bucket so that high-iron refractory material from one kiln and low-iron material from the other kiln can be handled simultaneously but separately if both types are being made. This conveyor traverses a rectangular path, 80 feet horizontally and 40 feet vertically, elevating these materials and discharging them into the two original 600-ton steel storage bins. A 7½-horsepower motor operates this conveyor through a speed-reducer. Two 18-inch by 30-foot shuttle belt-conveyors load railroad cars from these bins.

For the manufacture of pressure hydrate the product of the two Clyde 1½-ton batch hydrators in Plant B is carried by a screw-conveyor and bucket-elevator to a 35-ton steel bin. A short screw-conveyor automatically feeds this material to a 2-ton-capacity weight-batcher which is connected to a Fairbanks springless dial scale with a Fairbanks Printomatic attachment. A photoëlectric cell on the scale stops the feed screw when the desired weight is reached.

The material enters the pressure hydrator through a Nordstrom plug-type valve and 10 per cent. of water is added. The hydrator is a 5- by 15-foot insulated cylinder closed at the ends and provided with internal mechanical agitators, driven by a 75-horsepower Westinghouse motor through Gates V-belts and a Foote gear-reducer. When the lime is in the hydrator steam is injected at 40 pounds' pressure and this, combined with the hydration, raises the internal pressure to 120 pounds per square inch. The hydrator is also

(Continued on page 75)

Electric-eye scale with automatic recorder connected to batcher over pressure hydrator.



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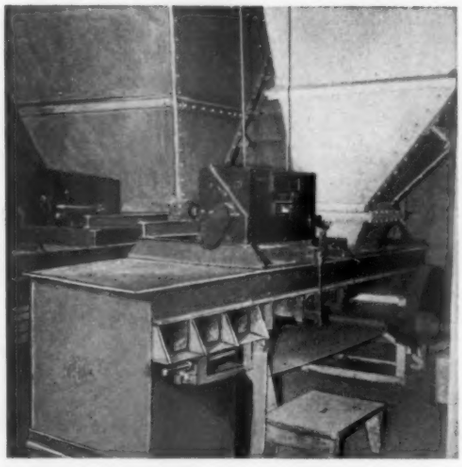

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Ceramic Sign-Posts to Lime Development

IN many fields of human endeavor it behooves us, individually or as an industry, to step back from our specialized world now and then to obtain a perspective that will not only lift us out of our set ways, but will also tend to make us aware of short cuts and profits that have grown from the mistakes and successes of allied technological development. It is not the writer's object here to present a treatise on the field of ceramics; and yet there presents itself an opportunity to make the lime industry more aware of its place in the nonmetallics field, and indicate some very obvious, but generally disregarded, ties that can not, and should not, be overlooked.

By modern accepted definition we learn that the ceramic field covers all the products of a nonmetallic and inorganic nature in which relatively high temperature treatment is a vital step in the processing of the original raw materials used. It covers structural clay ware, such as brick, tile, pipe, flues, conduits, and blocks. It covers the field of refractories—clay, magnesia, silica, chromite, dolomite, bauxite, and many others. It covers the pottery, glass, and enameling industries. It embraces the cement, lime, and gypsum industries, along with the manufacture of insulation and abrasives.

In all these branches we are concerned with the quarrying and mining of nonmetallic minerals, with grinding, sizing, beneficiating, washing, drying, and high-temperature chemistry. Complex and minute particles and systems, whose sub-microscopic or colloidal nature is still far from being understood, continually confront and confuse us in the many processes and applications.

The writer has been fortunate in having functioned in several branches of the high-temperature nonmetallics field, both in research and manufacture, and he feels that the several branches, and in particular those concerned with clay and lime, can learn a good deal from each other. Brick has long been associated with lime, not only through mortar contact, but even much earlier in the heat of brick-lined lime kilns.

Let us draw a few parallels in manufacture and point to similarities that we can later make the common basis for study and investigation. In the winning of the raw material clay is quarried much as are the unconsolidated deposits of chalk, marl, or oyster shells, which, in most instances, lend themselves very readily to beneficiation methods. The hard shale, likewise, is drilled, blasted, crushed, and ground, as is the case of the crystalline limestones or marbles. Clay or shale is usually stock-piled for drying and blending purposes before firing. Limestone in many plants could also follow a separation system for more uniform calcination, although blending might be done to better advantage after calcination for many reasons. In both cases considerable improvements in quality result, as many lime men know.

The physical characteristics of limes of similar chemical quality are often the most valued, and yet least understood properties in their make-up. In practically all the uses to which lime is put, excepting metallurgy, the transformation of the oxide to the hydroxide represents the most critical and final phase of lime-processing technique. Here, again, the clay technologist has delved into colloidal chemistry and the study and application of plasticity, viscosity, adsorption, cataphoresis, ionization, and the effects of stability and settling rates of flocculated or dispersed suspensions by electrolyte additions and pH adjustments. We, in the lime branch, should concern ourselves equally well with these subjects in improving our milks of lime, putties, and dry hydrates, and pass on our findings to our lime users. The clay ceramist works with these terms and concepts in his plant every day, and he has learned to control and improve his products through their application. The lime technician could well do likewise. Some of us have already applied electrolytes, etc., to improve certain lime properties. Heavy mullers or wet pans in clay plants improve the plasticity of clays. Similar improvements might be expected in subjecting lime putty to such treatment, if the aging time is to be limited.

Electrophoresis is applied to speed up the dewatering of clay suspensions or filtration. Lime putties may be equally affected and filters made more efficient with highly plastic limes in putty plants.

In the matter of wet hydration with excess water we must study and control the time, temperature, and concentration in slaking for the maximum conversion to plastic putty. In dry hydration we must be original enough to develop more than just an apparatus for mixing lime and water. The latest investigations point to very low temperature hydration for improved hydrates. We must, therefore, employ dispersed water, agitated and mixed with dispersed lime, so that heat can be quickly disseminated and kept low. Hydration-apparatus design, however, is only part of the story. Relatively fine lime of narrow particle-size range, all burned or sorted for uniform calcination degree, is a prerequisite. Present calcination processes probably make perfect hydration control still questionable.

Not until we, who are engaged in lime manufacture and research, realize what effects small impurities might have on limes at various high temperatures, can we systematically begin to standardize or classify our limes, and begin the elimination of variables which confuse us and cloud our results. In clay, enamel, or glaze research we start with materials of definite composition or mineral proportions, adding others in endless series, combinations, and amounts. Here, again, the lime investigator can take his cue, working with chemically pure carbonate and blending in all types and sizes of impurities, to ferret out the trouble makers in his particular deposit and rock, and find ways of correction.

Beneficiation is a success story in many industries. We use flotation for many minerals, including cement raw materials. We use tabling, elutriation, magnetic separation, electrophoresis, grinding and screening to certain sizes for purposes of removing impurities of predominant sizes; and we employ classifiers and even centrifuges in some low-cost minerals like talc or clay. We could, again, open our eyes and apply what others have learned to do profitably and on a large scale.

But in all these possibilities fine grinding and narrow-range sizing prior to calcining will be necessary before beneficiation and fully-controlled calcination can be employed. In clay processing a purified, or beneficiated, finely-ground and accurately-blended raw material is molded under pressure before drying and firing take place. Grog, the non-plastic ingredient of most clay bodies, is made by compacting clay, burning it beyond dehydration and oxidizing temperatures, and then regrinding it to size. Portland

By WOLF G. BAUER
Assistant to V. J. Azbe, Consulting Engineer
[When this article was written Mr. Bauer was the ceramic engineer of the Washington Brick & Lime Company of Spokane]

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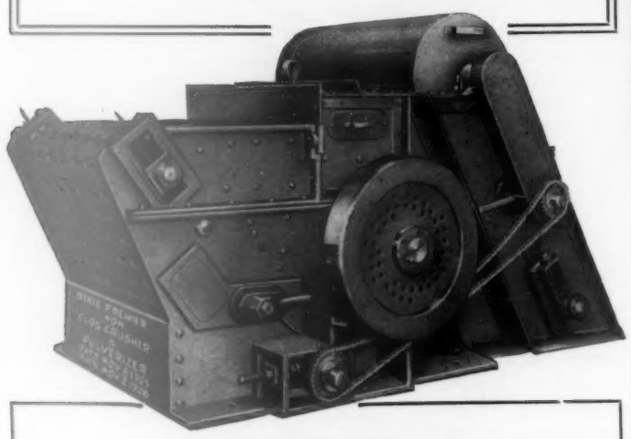

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cement is made along similar patterns. Lime of superior quality or special characteristics could, likewise, be made from impure or otherwise unsuitable limestone, ground, beneficiated, molded into pellets with organic binders, or moved continuously by use of mechanical or pneumatic pump action through intensely-heated refractory channels. Specially-designed muffle-type railroad tunnel kilns with their well-known control advantages are not at all out of the question, along with the principle of submerged combustion applied to dust concentrations of gas-suspended limestone particles. Excellent lime has been made in brick kilns of the writer's acquaintance, because of full control within 5 or 10 degrees at the high-heat period below 2,100 degrees F., which prevented formation of low eutectic melts of magnesia, iron, silica, alumina, sulphur, and alkali impurities in the lime.

It is the writer's firm belief that the lime of the not-too-distant future will be made from finely-ground and evenly-sized limestone, purified or in the original state; as only this physical state would allow the use of apparatus for correctly timed and controlled calcination and subsequent hydration. Calcinators to handle this type of material must be evolved; and already we are employing the first forms of this type of kiln outside the sphere of the rotary. From there it is only another step to the heat treatment of dust.

Future lime technology must increasingly concern itself with the thermal history, not only of lime, but of all the minerals found as impurities in the stone, and subject to investigation the solid, liquid, and gas phases of simple and multi-component high-temperature equilibrium systems. Specialized petrographic techniques, coupled with X-ray and electron photo-micrography, will be employed as tools.

Much as the ceramist and geologist are already coöperating in this field of high-temperature melts and crystallization, so will the lime worker learn to use their tools and methods of study. Individual imagination must slowly replace standard concepts in visualizing space lattice and cell arrangements of oxide, carbonate, and hydroxide, with their interplay of water and carbon dioxide. Like the ceramist, the lime researcher must always take into account the glazing and fluxing effects of volatile impurities from the stone, the combustion gases, the degree of dissemination of the non-volatile minerals, and the elements present. Minute quantities of these may have greater effects on the properties of the resulting oxides and hydroxides of lime than has, heretofore, been surmised.

In clay bodies fired to temperatures similar to those reached in lime kilns shrinkage, vitrification range, color, density, glass content, hardness, porosity, etc. are powerfully influenced by small quantities of certain alkalies, metal oxides, or mineral salts, along with time, draft, and kiln atmosphere. Clean brick and clean lime of high purity could never stick or slag in the kiln at the relatively-low temperatures prevalent, even when considering the pressure contact of heat-softened lime-clay interfaces. Changes in probable viscosity and composition can frequently be noted with the naked eye in sampling slag from different parts of the kiln lining. This phenomenon, though generally not at all evident, must, nevertheless, be active in many infinitesimally small portions of the lime. It becomes increasingly clear from all this that the time factor is the predominant influence, everything else remaining equal.

This brings the discussion to the point in question. In ceramic clay burning a "soaking" period at certain temperature levels must be maintained in order to bring on vitrification and crystallization of certain components of the body mix. The condition of the kiln atmosphere is here most important. It seems to the writer that if we could hold a molecule or cell of calcium carbonate at, or slightly above, the necessary calcination temperature only long enough to drive off the carbon dioxide, instead of many hours' soaking to penetrate thick lime layers, we would have not only reduced the high internal CO_2 pressures but prevented the partial vitrification at the lime-impurities interfaces. Lime may be soft-burned, show no glazing or vitrification to eye inspection; but if it contains one-half or one per cent. of silica, iron, and alumina combined, which is 1 to 2 pounds per barrel of lime or 1 ton per day in a 100-ton plant, a good many pounds of these must be tied up with the lime in the low eutectic compositions above 2,400 degrees F., according to our ceramic concentration-temperature diagrams dealing with these oxides. Time is the element that controls the extent of these combinations, and time can fortunately be shortened tremendously in this business of driving the CO_2 from limestone. Calcination of the dust-size carbonate under full thermal control is the answer for the following reasons:

1. Beneficiation may be employed on such material,
2. Lime-impurity reaction time can be greatly shortened,
3. Temperature control will be positive, and
4. Subsequent conversion to hydroxide will be more complete.

Let us be sure that we do not confuse kiln control with time-temperature control of the individual particles.

A critical self-analysis will disclose many practices and beliefs that come under the terms of "generally accepted" and "traditional," terms that have served as anchors and blinds to practical lime men. We leave ourselves wide open to a storm of criticism in pointing out some of the practices in the handling and use of lime which have become standard without scientific basis or proved ultimum efficiency. But often such criticism alone sets the mind to work, and much constructive thought is needed.

The large majority of our calcining equipment still calcines lime batches or streams of lime that show the effects of great variances in the thermal history of individual pieces; and, yet, other ceramic and metallurgical industries have achieved positive high-temperature control of every piece treated. Having no such uniformity, we resort to the human eye in sorting superficially, if at all. Out in the chemical or construction field we leave the design of slaking systems and techniques of slaking to our users. We furnish a lime that works best for the customer, no matter how inefficiently it is handled and slaked, and let it go at that. Many mechanical slaking devices in the chemical and construction fields have been designed by mechanical engineers with the obvious object of mixing water and lime in a simple agitation apparatus. In the light of what little we already know to-day most of these devices show no improvement over slaking practices employed hundreds of years ago. The writer has observed and tested dozens of these machines, all giving different results, although employed for similar purposes in the same industry. In mortar and plaster lime usage we still entrust our limes to masons and plasterers and their helpers, who, even on large jobs, slake by hand with the traditional hoe in barrels and boxes. We find that, despite finer grinding, portions of the lime can, and frequently are, being burned or drowned. In our plants we still have grit and unslaked lime particles diluting our hydrates and putties, often crowding the circulating loads between separators and hydrators, despite the fact that, in many instances, these unslaked particles of lime very seldom break down and hydrate further in the relatively-brief time allotted to dry hydration or the few weeks or days allowed nowadays for putty aging at the low temperatures. At our present stage of development it may be

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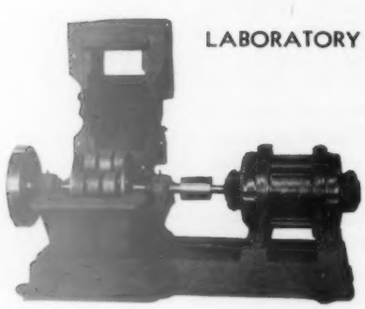

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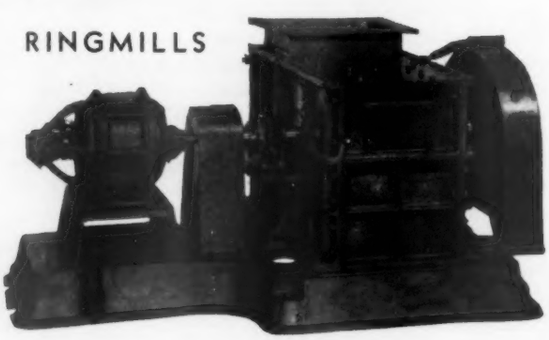

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quite unorthodox to say that perfectly-slaked lime needs no aging after slaking, but is not the very fact that we do age putty an admission of imperfect slaking methods with improperly-burned lime?

In order to establish some prerequisites vital to complete conversion of CaO to $Ca(OH)_2$ with excess water, let us list a few ideal conditions that should be met:

1. All the CaO particles must have passed through identical heat treatment and have a rather narrow limiting particle-size range below, let us say, 50-mesh.

2. The initial mixing of the water and lime must bring about complete wetting of all the individual grains, and this water-lime system must be sustained in completely-dispersed form and mobility without lumping or balling-up tendencies.

3. As slaking commences, we have essentially a binary system of lime and water with three phases—solid, liquid, and gas. These phases must be kept under control within set limits of pressure, concentration, and temperature.

4. The homogeneity, and, thereby, the freedom from steam holes and hot spots must be maintained as the mass thickens and the apparent action subsides. The developed heat must be retained as high and as long as possible by insulation and concentration.

With these points in mind, let us review the more common slaking practices.

Limes furnished the chemical and construction fields vary from 2 inches down to dust and show many degrees of hard or soft burning. This generally violates our first prerequisite condition. As high-calcium lime is dumped into excess water a rather large percentage of our infinitesimal CaO cells within the interior of the lumps and harder-burned portions are not, or only sparingly, in contact with absorbed water. Instead of finding rapid wetting and mobile dispersion, we have tight and compact systems awaiting sudden hot water or steam action, as the lump or particle begins to split and explode in the midst of violent slaking. This picture would apply in some measure even to a single piece of fairly hard-burned lime of one-half-inch diameter, as it begins to slake in cold, excess water. As slaking reaches its peak, the mass tends to take matters of mixing, dispersion, and local temperature rise into its own hands. We observe only boiling and an apparently thorough pneumatic mixing action in the mass, augmented by our slow-acting, mechanical stirring devices or hand tools. But if we could poke a microscope into the centers of this commotion, we would no doubt observe a very unbalanced and changeable state of affairs in the interaction of the ultimate components of our solid-liquid-gas system. Here, again, we fall short of ideal conditions at this stage of the slaking process as so often carried out with present equipment and limes. In the fourth stage we often violate our preconceived rule by either terminating all mechanical agitation after slaking or diluting and cooling the system for purposes of pumping and screening.

It is not the writer's place here to suggest equipment or mechanics that will fulfill in some measure the requirements we have set for ourselves in conducting more successful wet hydration for maximum conversion, availability, or plasticity. The writer has experimented superficially with high-speed stirring and frothing prior to and during the slaking period and found indications of new possibilities. The clay industry subjects its clay to a partial vacuum for purposes of "de-airing" the plastic mass. In large plant installations high-speed agitation and dispersion in a continuous process, followed by "de-airing" and high insulation, might speed up putty or milk-of-lime manufacture and help to improve and standardize putties. This writer can readily envisage small, compact, high-speed putty-making machines, equipment that can be mounted on small trailers and moved from job to job by the contractor. Such units would make putty continuously and incorporate controls for temperature, pressure, proportioning, and standard consistency, forcing a slow stream of putty from a flexible hose to the sand or cement mixer. There is absolutely no reason why such equipment can not be built to fulfill all our previously-laid-down rules for ideal slaking conditions. All this, in general, would also hold true for milk-of-lime or dry-hydrate manufacture.

In our engineering work we seem always to follow a certain cyclic pattern. A machine or process is designed, and slowly its efficiency is raised to the practical ultimum; after which a new principle is used to accomplish the same job still better, with another cycle of improvements following. The day of large, cumbersome calcining and slaking machinery, where control is incomplete and the long time factor presents a necessary evil, will eventually pass. Almost all chemicals made and used today in industry are in the form of finely-ground and standardized powders that lend themselves to easy blending, batching, conveying, handling, or processing. To those who have taken the trouble to test and analyze the various inside and outside portions of all types of lime pieces from our kilns, controlled thermal treatment of powdered carbonate will appear a necessary and logical development, especially with limestones of certain impurities and make-up. It is only in the metallurgy of iron or carbide, for instance, that the larger sizes of lime particles constitute any kind of physical advantage.

In closing, the writer may seem overly visionary and impractical, but if one were to review the last ten years' general technical advances by visiting plants and studying the voluminous technical literature in our allied branches of ceramics, one would quickly realize how practical the visionary can become in a relatively-short time. There are many sign-posts to lime developments in other than the ceramic field, and it is hoped that this attempted analogy may start others to make many more important correlations.

Kelley Island *(from page 69)*

heated by electric-strip heaters under its magnesia covering. These heaters are set to maintain the internal temperature of the hydrator automatically at about 200 degrees F. when it is not operating. This prevents any variation in the product which might occur if the hydrator was started up with a cold drum. When the hydrator is in operation these heaters keep the temperature at about 300 degrees F. This machine produces two 2-ton batches per hour.

The pressure hydrate is discharged from the hydrator through another Nordstrom valve which, like the first, is pneumatically operated. A screw-conveyor discharges this lime into a bin over a 33-inch Fuller-Lehigh mill. An elevator and a screw-conveyor feed the finished pressure hydrate from this mill into one of the bins over the two bag-packers in the main hydrating plant. This product meets government specifications requiring over 92 per cent. complete hydration and is used for wall plaster, white coat, etc.

Like all other departments of the plants, those described were designed by the engineering department of the Kelley Island Lime & Transport Company. All the screw-conveyors, bucket-elevators and belt-conveyors were supplied by the Stephens-Adamson Manufacturing Company.

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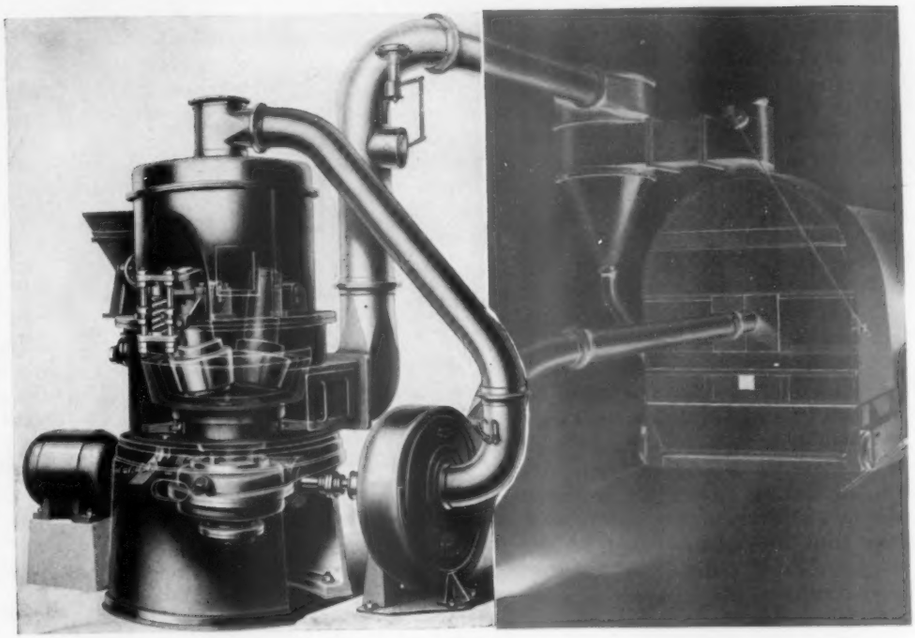

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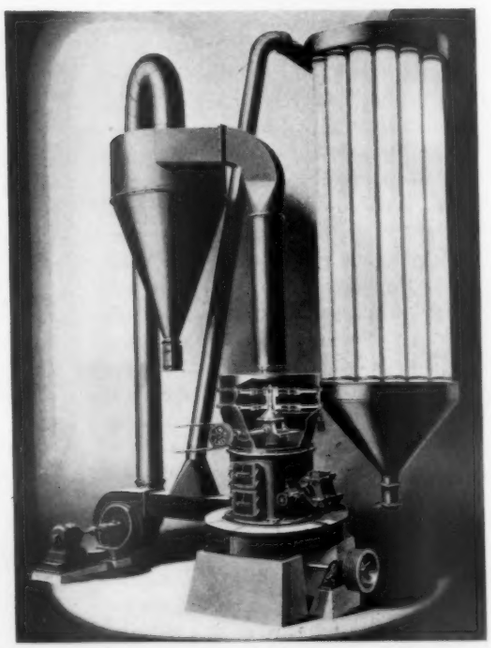

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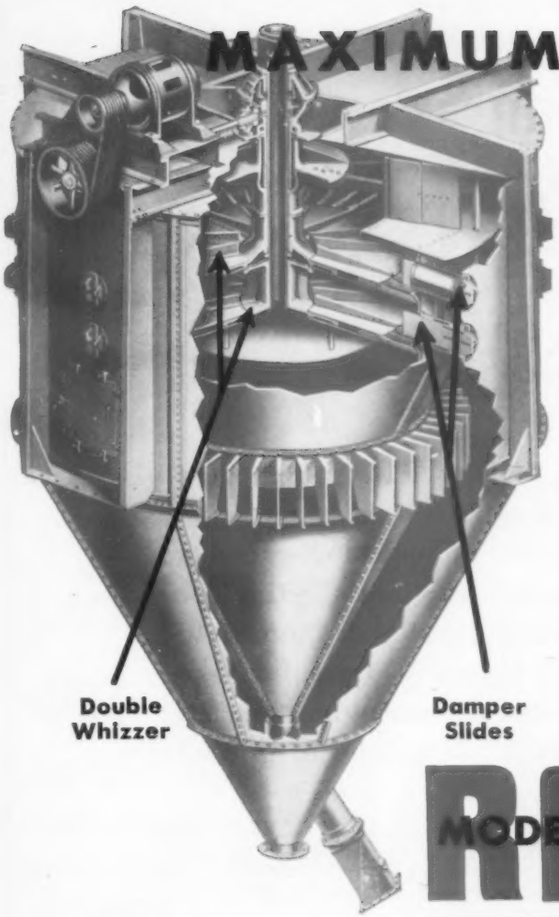

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in Classifying Hydrated Lime, Cement and other Materials with the Double Whizzer Type MECHANICAL AIR SEPARATOR

The double whizzer feature is a Raymond development that gives closer product control and greatly increased capacities in the extreme fineness range. The vertical damper slides (see illustration) are readily adjustable from the outside for regulating the classification, permitting wide range control without any interior adjustment.

For superfine grades of hydrated lime, agricultural lime, and chemical hydrate testing 99.9% through 400-mesh, and high surface area cements, Raymond double whizzer Mechanical Air Separators assure high fineness, high uniformity, and high capacity. They are used in the lime, cement, chemical, fertilizer, food and non-metallic minerals industries. They can be operated in closed circuit grinding arrangement with any standard pulverizing unit.

RAYMOND

MODERN LIME PRODUCTION METHODS

LABORATORY SEPARATOR

A small unit, built on same principle as the large Raymond Separators, ideal for classifying test samples.

RAYMOND AUTOMATIC PULVERIZER

equipped with the Whizzer Separator

This is an efficient unit for disintegrating and purifying hydrated lime. It is provided with a throw-out attachment for rejecting impurities.

When large tonnages are to be handled, the Mechanical Air Separator (see upper illustration) can be set up to take lime direct from the hydrator and recover the extreme fines of the good lime, discharging the tailings to the Automatic Pulverizer for refining the remainder of the good lime by removal of impurities.

RAYMOND
Automatic Pulverizer

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street CHICAGO

Pit and Quarry Helps You Operate More Profitably

Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you practical ideas on every phase of your operations.

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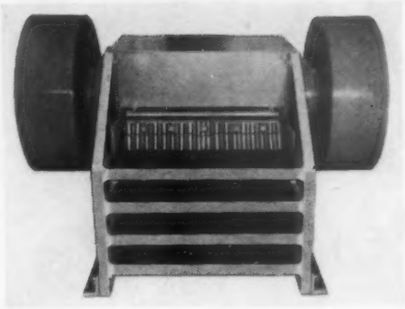
EAGLE CRUSHERS for Plus-Performance



EAGLE

Roller Bearing JAW CRUSHER with 10" x 36" jaw opening. One-piece electric welded frame. Reversible jaws and cheek plates. Jaws adjustable while in operation. Capacities from 20 to 540 tons per day.

POWER • ENDURANCE • ECONOMY

are designed-and-built-in features of EAGLE Jaw Crushers.

These rugged machines are available in seven sizes ranging from 10"x16" opening to 18"x36". Wheel-mounted for easy transport—also truck or trailer-mounted models.

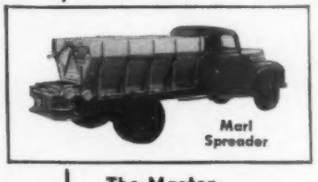
The EAGLE Pulverizer, for agstone, is readily convertible to impact breaker type for secondary crushing.

The EAGLE Truck Mounted Loader insures fast, low-cost loading, capacity to 3 tons per minute. One-man control. *Write for Information.*

EAGLE CRUSHER CO., INC., Galion, Ohio

BIGGER PROFITS with BAUGHMAN SPREADERS to Handle Your Plant's Agricultural Limestone

The Mammoth



The Master

The New Marvel

With Baughman Limestone Spreaders on the job you can easily fill the big orders to come for agricultural limestone—and be assured of properly applying the limestone on farmers' fields because the specially-designed revolving disc maintains an even distribution up to 40 feet in width.

There is a Baughman Spreader to fit your plant and market—models range from 6 to 18 tons in size, including the three models shown here.

Get the facts today on the outstanding features of the 9 to 1 favorite spreader in 1941.

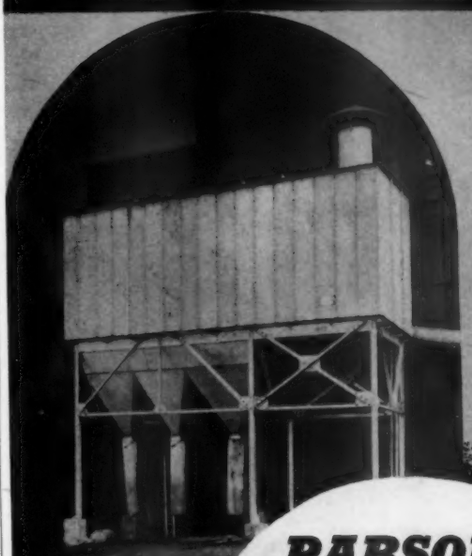
BAUGHMAN MFG. CO.

Specializing in Spreading Equipment

JERSEYVILLE, ILLINOIS

Fines are profitable

PAY DIRT..



PARSONS OVAL BAG DUST ARRESTORS PAY THEIR WAY

There are hundreds of cases where Parsons Oval Bag Dust Arrestors actually pay for themselves in no time with the "fines" collected. Once installed Parsons Oval Bag Dust Arrestors start increasing production right "off the bat" and on top of that they protect employees, machinery and plant and make it a better place to work in —clean and pleasant.

Back of the success story of Parsons Ovals is a quarter of a century of engineering experience with hundreds of large and small installations in all types of industries. Many of them have been in daily operation for years. During these years, many new exclusive features have been developed by Parsons engineers and today as never before Parsons "Ovals" are head and shoulders above the field.

Write today for the new free bulletin on "Mastery of The Air."

PARSONS

ENGINEERING CORPORATION

CLEVELAND, OHIO

KENNEDY STONE PREHEATER AND DEHEATER

Saves in Lime Production

40% SAVINGS IN FUEL
20% INCREASE IN CAPACITY

Plus
A Better Product!

It has been known for many years that better lime could be made in rotary kilns than in vertical kilns, but at a considerable handicap in price.

The great length of former types of rotary kilns, sometimes exceeding 400 feet, has failed to solve the problem of efficiently reducing the temperature of the exit gases.

Now, thanks to the KENNEDY principle of preheating and deheating, it is possible to make a high-grade lime of better quality than was formerly obtainable, in kilns less than 150 feet long.

This principle permits the effective recovery and use of the exit gases, and in actual operation has shown 40% saving in fuel, with capacity increased 20% and more.

Short kilns employing the KENNEDY method also acquire an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces the formation of kiln rings.

Overburned and underburned lime is practically eliminated. Coal feed and lime calcination are switchboard controlled.

KENNEDY-VAN SAUN
Also Manufactures
CRUSHING, SCREENING, AND ELEVATING EQUIPMENT
Pneumatic Transport Systems
Pulverized Coal Equipment
and
STEAM GENERATORS
Write for one of our Engineers to call.

Ask for Bulletins 401 and 770

KENNEDY-VAN SAUN MFG. & ENG. CORP.
2 PARK AVE. NEW YORK, N. Y.

NEW MACHINERY and SUPPLIES

• Lime Spreader

The Even-Spread lime spreader, made by the Even-Spread Spreader Company of Owensville, Ohio, has a V-type bed with two small augers in troughs in the bottom, lengthwise of the bed, with provision for easily changing speeds for positive delivery of different grades and applications of lime to the rear of the bed. The easily-detachable spreading mechanism, which is mounted crosswise at the rear, consists of small augers mounted in tubes with adjustable holes in the bottoms for different applications. The maker claims the

Rear view of the spreader.

machine will spread a strip over 20 feet wide, and can be mounted as low as field conditions permit. The spreader is of leak-proof, all-steel welded construction insuring long life and perfect alignment of working parts. Main bearings are of the latest ball type with sealed housings. All gears run in oil. While this spreader is built primarily for fine dry lime and limestone it will also handle chips, screenings, sand, cinders, and damp lime successfully.

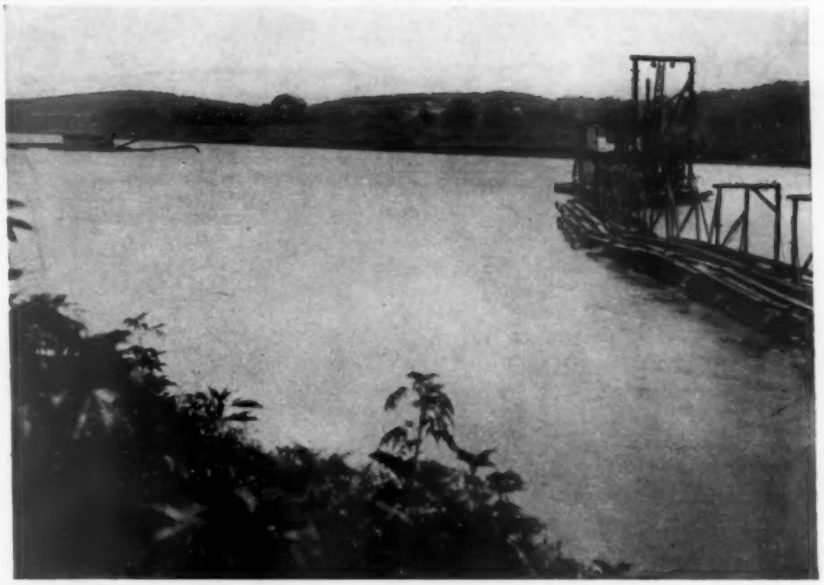
• Particle Sizer

The present rapid expansion in the general use of various mills and other fine-grinding apparatus emphasizes the fact that innumerable processes depend vitally upon accurate control of the size of particles. Precision in control is necessary. But this is not enough—for competitive conditions make accurate knowledge of particle size, particularly effective in solving marketing problems.

Pierce M. Travis, an authority and consultant in colloid research, has developed a new sedimentation method because of the failure and limitations of other methods such as turbidimetric, microscopic, etc. This new method offers great accuracy, simplicity, low initial cost, ease of manipulation and percentage determinations as well as a solution to the requirements for a routine instrument.

Particle sizes to 325 mesh (44 microns) may be easily determined by screen tests and now the Palo-Travis particle-size apparatus makes it possible to determine superfines ranging below 325 mesh direct in microns. Determinations may be made on almost any substance, providing there is a medium in which the substance is insoluble and a wetting agent that will disperse the particles.

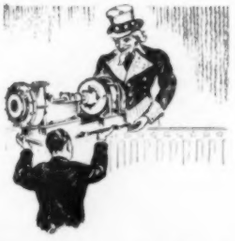
This sedimentation method built by Palo-Myers, Inc., New York, is based on a modification of the Werner apparatus and makes it possible to determine particle sizes down to 2 microns. The grading below 2 microns is not



Dredges that actually seem to breed!

In more than one location, a progressive sand and gravel producer installs a Morris Hydraulic Dredge with peculiar results. A short time later, a second Morris Dredge appears at work on another deposit operated by a fellow producer nearby. Then a third, and a fourth, and additional Morris Dredges in rapid succession, all working within sight of each other on different deposits owned by different producers.

The reason? It's obvious. Morris Dredges operate with such exceptional speed and economy that when one of these money-makers is put to work, the news of its performance quickly spreads throughout the district. That's why Morris Dredges actually seem to breed!



WE HAVE ENLISTED "FOR THE DURATION"

We have placed at the disposal of the Government all our facilities that might be of use in the national war effort. But our remaining facilities are at your service, and also the advice of our engineers to help you secure best results from your present equipment and to plan for your future needs.

MORRIS MACHINE WORKS — MORRIS ESTABLISHED 1864 — BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

separated but is recorded as the amount of superfines under 2 microns.

When dispersed particles exceed the colloidal dimensions, the particles tend to settle under the force of gravity and the rate of sedimentation offers a means of measuring particle size.

The apparatus consists of a large glass tube, long enough to give a height of fall slightly over one meter. A mixing chamber for holding the sample is separated from the long tube by a stopcock having a large and accurate bore, so as not to interfere with the settling of the materials. The glass tube is mounted on a suitable metal support. At the bottom of the large glass tube, the sedimentation measuring tube which has a flat bottom and graduations in millimeters, is supported by an interchangeable ground glass stopper. A micrometer eyepiece, mounted at the left of the sedimentation measuring tube, enables one to read sediment heights in fractions of a millimeter. To the right of the sedimentation measuring tube, there is a small electric tapper to keep the sediment column level, and further to the right of this, an illuminating unit so that readings can be easily made. An electric stop-clock is supplied on all outfits operated on 110 volts, 60-cycle a.c. Instruments operated on other currents are furnished with a stopwatch. The electrical equipment is housed in a wood cabinet with front bakelite panels.

• First-Aid Equipment

Two new first-aid items have been added to the extensive line of Mine Safety Appliances Company, Pittsburgh. The new items include the M.S.A. folding-stretcher outfit and M.S.A. wood-traction splint. The stretcher (but 49 inches long when folded) is quickly opened to full size army type. The frame is made of selected dried ash, and all metal parts are of malleable iron. The cover is of 12-ounce duck.

The new M.S.A. wood-traction splint is designed for use in supporting fractures of the arms or legs according to the accepted traction method prescribed by the American Red Cross. The Splint, made of clear hard maple with chamfered edges and shellac finish, is extensible to 66 inches (meeting maximum requirements), and telescopes to a compact size that is easy to pack and carry.

• Lubricating Unit

Heavy-duty mobile units for pressure lubrication of equipment on the job, known as Graco Convoy Lubers, are being offered by the Gray Company, Inc., of Minneapolis.

Various models are available, each complete unit including an engine-driven air compressor, a set of powerful automatic lubricant pumps for dispensing three or more different lubricants under pressure, suitable lubricant tanks or container supports, a battery of hose reels conveniently mounted, a spacious tool box, and even a complete kit of hand guns and lubrication accessories.

Lubricants are kept at the proper viscosity in cold weather by exhaust gases piped from the air-compressor engine. The heater may be disconnected in warm weather.

Hopper-type Convoy Lubers feature a 3-compartment, leaded steel lubricant tank with 225-pound capacity in each compartment. A 9-inch diameter opening in each compartment is sealed by a bayonet type cover against dirt, water and contamination.

Five hose reels with locking brakes provide four 30-foot, high-pressure, interchangeable, lubricant hoses with ⅜-inch bore—two for chassis lube, two for gear lubricants; also one 50-foot air hose with ¼-inch bore. All hoses terminate in suitable control valves and proper adapters.

• Type Cleaner

In view of the recent restriction on typewriter sales, the introduction of Reliance Durol liquid type cleaner is particularly timely. Clean type means less banging on the keys and makes typewriters last longer.

This product will be available in 3- and 8-ounce bottles with individual applicator and sealer on cap to prevent evaporation. Larger sizes will also be available.

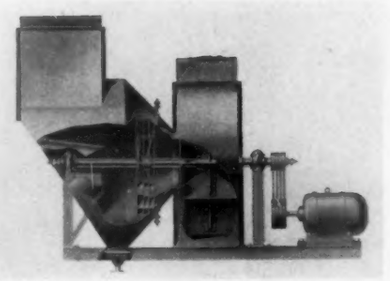
Readers may secure further information on Durol by calling their stationery or typewriter-supply dealer or writing to the Reliance Pencil Corporation, Mount Vernon, New York.

• Filter Fan

The new Schneible FiltreFan, made by the Claude B. Schneible Company, Chicago, is a collector unit designed to remove dust and fly ash from flues, kilns and furnaces, smelter stacks and cupolas.

The collector consists of a combination housing on which is mounted a rejector wheel and fan wheel. These two wheels are on a single motor-driven shaft. Solids are removed from the gas stream by means of this rejector wheel which throws the particles into a dead zone and hopper by centrifugal force. The dust particles do not come into contact with the wheel, thus eliminating wear on the wheel blades.

Dust-laden air or gas enters the scroll of the rejector wheel through a tangential inlet. It is caused to rotate by vanes, throwing the dust particles outward against the scroll from which they travel to the discharging hopper. The cleaned air enters the periphery of the rejector wheel and is drawn toward the center between the side sheets and the vanes. Through an outlet port in the center the air is drawn by a conventional fan wheel to be exhausted through an outlet duct.



Cut-away view of the fan and filter unit.

Wheels, housings and hopper are built of heavy steel plate. The combination housing is mounted on a single base which includes the motor mounting. The housing is split horizontally in line with the shaft to make the rotating assembly removable. This assembly is dynamically balanced at the factory. Anti-friction bearings and large shafting prevent distortion of moving parts. Operated at comparatively low speeds, abrasive wear in the unit is said to be negligible.

For high-temperature stack gas, the Filtre-Fan is equipped with a hollow water-cooled shaft with packing glands and water connections provided at both ends. If desired, jets are placed in the refuser wheel housing. Water from these jets floods a portion of the scroll and hopper, both protecting against abrasion and insuring dustless removal of the solids.

• Electric Tool

The Whiz electric tool, manufactured by the Paramount Products Company, New York, is an all-purpose machine of many uses about the plant and shop.

Weighing less than 3½ pounds and operating from any light socket it is sturdy enough to do the heaviest drilling and grinding job and has a score of other uses.

The Whiz tool utilizes no less than fifty different accessories, many of which do several different jobs. The frame is die cast, lightweight, giving ease of handling and long life.

Motor-operated tool is useful in many ways.

The three-jaw, coil-spring chuck has ¼-inch capacity, and it is triple-geared for extra power. There is ample power for the most difficult drilling operation. The ball-bearing thrust insures smoothness of operation.

These tools operate on any 110-volt alternating or direct current, being powered by a heavy-duty universal motor which does not overheat even when operated over long periods. A large cooling fan provides ample ventilation.

The switch is arranged to operate with the same hand which holds the tool. It is of the permanent built-in "on and off" type. Large commutator brushes make for long wear, and screw caps are provided for easy replacement.

Truck-mounted lubricating unit serving tractor and scraper.

Note system of piping leading to Sly Dust Filter in center background—and general cleanliness of plant.

● *In center foreground is a Tyler-Hummer vibrating screen with dust pipe connection at lower end.*

● *Sly Dust Filter of unit type with three small dust connections.*

● *"Dry Pan" with housing and exhaust connections.*

SLY DUST CONTROL

MEANS *Clean* PLANTS . . . *YIELDING GREATER PRODUCTION*

These three interior views show one of the plants of a prominent manufacturer of refractories.

Our assignment was to engineer and install the filters, piping, and other accessories necessary to clean up the old plant.

How successfully this was done is evident from these views taken after installation. The plant is operating full blast and *dust is being exhausted from vibrating screens, bins, elevators, crushers, feeders, belt conveyors—a total of 22 points.* Note the absence of dust—how clean the plant is.

Write us fully about *your* problem. We shall be glad to analyze it and tell you exactly what can be accomplished.

THE W. W. SLY MANUFACTURING CO.
4745 Train Avenue **Cleveland, Ohio**

SLY
INDUSTRIAL DUST CONTROL

Locomotive

The outstanding feature of the new 65-ton Diesel-electric switching locomotive introduced by the Atlas Car & Manufacturing Company, Cleveland is the construction of the drives which give surprising pulling ability, and which are said to insure dependable service. These drives are of the double-reduction spur-gear type, totally-inclosed, and arranged so that the motors are mounted as integral parts of the drives. The drives are mounted on the axles with Timken roller bearings and heavy duty ball bearings are used to mount countershafts and armature shaft. A third point support is provided, allowing the axles to follow track irregularities without developing twisting or binding strains.

These drives in smaller sizes have been used on Atlas mining and industrial locomotives for more than 20 years, and have a most en-

The 65-ton Diesel-electric locomotive.

viable record of successful performance, with the lowest maintenance costs. The housings are of cast steel, and are arranged to completely inclose the motors and gearing. The gearing is of steel with the teeth very accurately cut. The pinions and gears are mounted on alloy-steel heat-treated countershafts, which in turn are mounted on anti-friction bearings. The latest type of dust seals are used and the complete drive unit is a simple, totally-inclosed, self-lubricating power plant which operates with the very minimum of attention.

These drives are the most important feature of this locomotive but the construction of the entire locomotive is heavy and substantial, in keeping with the traditions of Atlas locomotive design.

Welding Rod

To conserve nickel for the war effort so that it can be used where it will do the most good, the American Manganese Steel Division of The American Brake Shoe & Foundry Company, Chicago Heights, Illinois, now has available a new manganese-steel welding rod known as V-Mang.

An alloy steel containing 12 to 14 per cent. manganese, molybdenum and other elements, this electrode has resulted from research started by Amsco's metallurgists several years back looking for a better welding rod. It will replace Amsco nickel-manganese steel electrodes, except in a few exceptional cases, thus conserving this critical metal without hampering reclamation of manganese steel and other ferrous equipment parts, so necessary at this time. While molybdenum is costlier than nickel, V-Mang rod will be priced the same as Amsco nickel-manganese steel rod.

Thorough tests under field conditions have shown that the new rod can be applied as readily as Amsco nickel-manganese steel rod and that it has ductility and tensile strength equal to or better than nickel-manganese-steel rod as applied. V-Mang can be used to repair fractures in manganese-steel parts, as well as for build-up work, depositing a uniform bead similar to that afforded by nickel-manganese electrodes.

V-Mang does not replace Amsco Mo-Mang, a high-manganese, high carbon, molybdenum rod that is not as ductile as the new rod and is recommended for build-up work only. V-Mang is available bare and coated in 1/8-, 5/32-, 3/16- and 1/4-inch diameters in 18-inch lengths.

Explosive

A new dynamic cartridge which will expand under tamping to fill the bore hole and concentrate the charge has been developed by the explosives department of the Hercules Powder Company, Wilmington, Delaware.

The new cartridge, called "Tamptite," eliminates the necessity of slitting cartridges, and allows concentration of a charge within the hole with little or no spillage of powder.

Dynamite in the new cartridge is packed in a waxed paper shell having a line of perforations spiraled around the dynamite stick. It contains the same weight of paper as a standard shell. The line of perforation is located between inner and outer layers of paper so that there is no direct track through which moisture might enter or ingredients leak out. The shell is not weakened to the point where priming is difficult, and the cartridges stand up in shipping and handling on the job as well as regular cartridges.

When tamped in a bore hole, the cartridge does not open as a slip cartridge does, but unwraps slightly as the cartridge expands to fill the hole. Splitting along the perforated line permits the dynamite to be telescoped to a shortened length while it expands to the diameter of the hole. Even in upper holes where dynamite in slit cartridges often spills, little or no spillage occurs with the new cartridge.

All Hercules brands and grades commonly used in mining, quarrying, contracting and underground work in sizes up to 1 3/4 inches in diameter, are available in the new shell.

PERSONAL MENTION

E. S. Guth, formerly general plant manager of the North American Cement Corporation, New York City, has been made vice-president in charge of operations. Other advancements include Thomas J. Harte, formerly vice-president in charge of sales to executive vice-president; and Edgar K. Miller, formerly auditor, to controller. The company has also moved its general offices to 41 East 42nd Street.

Charles D. Cavett has been made advertising and sales promotion manager of the Cummins Diesel Engine Corporation of New York. Mr. Cavett has been on the copy staff of Spencer W. Curtiss, Inc., Indianapolis industrial agency, for the past three years and prior to that time was engaged in newspaper and publicity work.

E. S. Tompkins, president of the Allen Cone & Machinery Corporation, has moved his New York offices to 120 Broadway, having formerly been located at 30 Church Street.

Here Is Your Nearest Worthington Distributor

For Sales, Rentals and Service on BLUE BRUTE Portable Compressors, Rock Drills and Air Tools. Get your EQUIPMENT-SAVER — FREE
see full page ad page 85

ALABAMA
Birmingham — Ed Gantt Machinery Co., Inc.
ARIZONA
Phoenix — Smith Booth Usher Company
ARKANSAS
Fort Smith — R. A. Young & Son
Little Rock — R. A. Young & Son
CALIFORNIA
Los Angeles — Smith Booth Usher Company
San Francisco — Highway Equipment Company
COLORADO
Boulder — Standard Machine Works
Denver — Morse Bros. Machinery Company
CONNECTICUT
Hartford — Holmes-Talcott Company
GEORGIA
Atlanta — Tractor & Machinery Co., Inc.
IDAHO
Twin Falls — Nelson Equipment Company
ILLINOIS
Chicago — Kennedy-Cochran Company
Rock Island — Western Equipment & Supply Co.
INDIANA
Indianapolis — Reid-Holcomb Company
IOWA— Des Moines — Electrical Eng. & Constr. Co.
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Kansas City — Machinery & Supplies Company
St. Louis — Webster & Hedgcock Tr. & Eq. Co.
MONTANA— Helena — Caird Engineering Works
NEBRASKA
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Easton — Sears & Bowers
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Oil City — Freeborn Equipment Company
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Pittsburgh — John McC. Latimer Company
Wilkes-Barre — Ensminger & Company
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Columbia — Bell-Lott Road Machinery Co.
TENNESSEE
Chattanooga — James Supply Company
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WYOMING
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Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Worthington Pump and Machinery Corp.

THIS BRUTE'S AN EASY BREATHER

Here's a brute for work — but *easy-breathing*, even after long hours of trouble-free, continuous delivery of air!

Worthington's famous Feather* Valves insure a simple "breathing" action without noise or destructive impact. The *punch* is where you want it, *on the job*, not in the compressor!

That's one reason why Worthington Blue Brute Compressors . . . gasoline-driven, diesel or electric . . . stay on the job longer, without costly delays for maintenance or repairs.

Investigate the whole Worthington line of Blue Brute Compressors, Rock Drills and Air Tools. *Compress more air . . . use less air . . . get more WORTH from air with WORTHINGTON.*

EQUIPMENT SAVER—FREE

The name of your nearest Worthington distributor is printed on page 84. Ask him — today! — about Worthington's EQUIPMENT SAVER, free to all users of compressors and air tools. It will show you how to conserve scarce metals, lower your maintenance costs. If your distributor is not listed, let us know and we'll send you this cost-cutting aid to efficient production direct from Holyoke.

* Reg. U. S. Pat. Off.

On the Job with

BLUE BRUTES

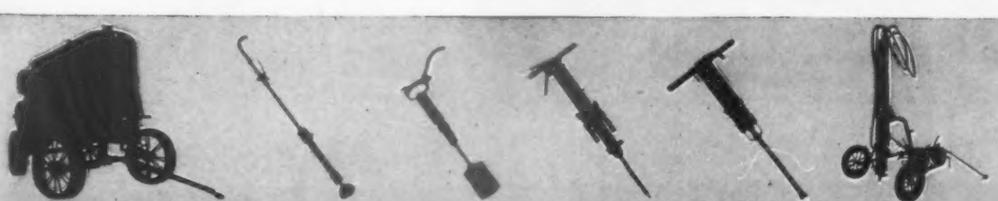
On a midwest construction job — the contractor reports, "5 Blue Brute Compressors in service six months and not a wrench used except when changing oil!"

Blue Brutes are performing like this in hundreds of army camps, navy yards, air bases, and ordnance plants throughout the country.

See distributor list page 84

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

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Worthington Pump and Machinery Corporation, Harrison, N. J. Holyoke Compressor and Air Tool Department, Holyoke, Massachusetts

Why continue to cut and bow wire rope, weakening the strands, making serious accident possible?

Use the Safety Clip. It can't be put on wrong — inexperienced workers can't cause the dangers of the U-Bolt put on backward. The Safety Clip takes a powerful, all-round Fist-Grip on rope. The four flat bearing surfaces far out-hold the finger-pinching U-Bolt Clip, and cannot crush and crimp wire rope.

The Safety Clip Gives More Steel for Armaments!

25% less steel is used in a Safety Clip assembly equal in strength to a U-Bolt-held rope. That steel can go to arsenals and plane factories for all-out military needs. Fewer clips are needed — that saves steel, too. And the rope-ends stay straight and round for re-use — no expensive waste from cut-off crimped-up rope ends.

THESE ARE YOUR SAFETY SAVINGS

No rope crimping or bowing	rope saved
No special wrench	tools saved
Bolts on opposite sides	tightening time saved
Can't go on wrong	accidents saved
Fewer clips needed	clips saved
Fewer rope breaks	accidents saved
No bent, battered threads	clips saved

95% rope strength delivered by test.

Distributed exclusively through Mill Supply Houses

Look for Laughlin Products in Pit & Quarry Handbook

THE THOMAS LAUGHLIN COMPANY
PORTLAND, MAINE

JOHN M. LUPTON, formerly assistant advertising manager, has been promoted to the position of advertising manager of the Robins Conveying Belt Company, Passaic, New Jersey. ALFRED S. OTTON, formerly advertising manager, is now handling important productive assignments in connection with the war work now being done by the company. Mr. Otton will, in addition, be responsible for both the sales and production ends of the screen-cloth department at Passaic.

W. C. BUCHANAN, president of the Allis-Chalmers Manufacturing Com- has resigned because of ill health. Directors elected WALTER GEIST, formerly vice-president, as executive vice-president, but there will be no election of Mr. Buchanan's successor until after the annual meeting which is to be held May 7.

MAX E. GRUNEWALD, formerly secretary-treasurer, has been elevated to the presidency of the Coplay Cement Manufacturing Company. EUGENE BLUM, former president and chairman of the board, continues in the last-named capacity. MILTON S. STEINER is the new secretary and ERNEST HALLER the newly-elected treasurer.

GEORGE R. HANKS, president of the Taylor-Wharton Iron & Steel Company, which this year is celebrating its 200th anniversary, has announced the promotion of J. A. KRUGLER from general sales manager to vice-president in charge of sales and purchases, and the appointment of J. L. LONERGAN, formerly with Morris Machine Works, as superintendent of the company's Easton, Pennsylvania, plant.

FORREST E. SMITH has resigned as sales manager of the Kensington Steel Company to become a manufacturers' representative in the southeastern states. He will locate at Asheville, North Carolina and will specialize on crusher and shovel parts, representing Frog, Switch and Manufacturing Company and other concerns.

B. W. CLARK, vice-president in charge of the Westinghouse Electric & Manufacturing Company's merchandising division, is now vice-president in charge of sales. He succeeds Ralph Kelly, who resigned to become executive vice-president of the Baldwin Locomotive Works.

CHARLES C. BYE, 80, of Wilmington, Delaware, former vice-president of the Warner Company, Philadelphia, died March 21 after a long illness. He started his business career in 1879 as

an office boy with the Warner Company and was connected with that firm throughout his entire business life, rising to be its secretary and a director, and later, vice-president. He retired about 10 years ago. Surviving are his widow and two sons, Reed C. Bye, vice-president of the Warner Company and Capt. Charles C. Bye, Jr., of the Army Air Corps.

EDWIN E. ELZEMEYER, 48, president of the American Pulverizer Company, St. Louis, and director of sales activities for the company, died at his home in suburban Glendale as the result of a heart attack, on February 22. He had been head of the firm since 1926, and was widely known in the pit-and-quarry and industrial fields.

GEORGE H. ELLIOTT, 56, vice-president of the Whitehall Cement Manufacturing Company, Philadelphia, died suddenly March 31 of a heart ailment. About 25 years ago he became Philadelphia manager for the Alpha Cement Company. Before becoming associated with the Whitehall firm, he was head of the Philadelphia office of the Edison Cement Company.

FRANK J. LARKIN, 59, traffic manager of the Woodville Lime Products Company, Woodville, Ohio, passed away March 27 at a Toledo hospital where he had been a surgical patient for ten days. Before joining the lime company many years ago he served as transportation commissioner of the Toledo Chamber of Commerce.

ALBERT J. LOVETT, 75, president and treasurer of the Grangers Manufacturing Company, limestone-products firm of West Stockbridge, Massachusetts, died March 31. His residence was in Brookline, Massachusetts. He was elected a director of the Grangers company in 1917 and became president and treasurer in 1919.

FREDERICK WOLFF, 61, president of the Irvington Sand and Gravel Company, died recently of a heart attack in his home in West Orange, New Jersey.

The Ransome Concrete Machinery Company, Dunellen, New Jersey, has appointed the American Steel Supply Corporation, Fort Wayne, Indiana, to handle its line of construction equipment in certain sections of Indiana.

The Marion Steam Shovel Company, Marion, Ohio, announces the appointment of J. A. Riley, district manager of its New York office, as export manager. His headquarters will be in the Graybar Building, 420 Lexington Avenue, after May 1. This will supersede the present address which is now in the Chrysler Building.

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Available in sizes 85 to 200 HP.; generator sets 55 KW to 115 KW, A.C. or D.C.

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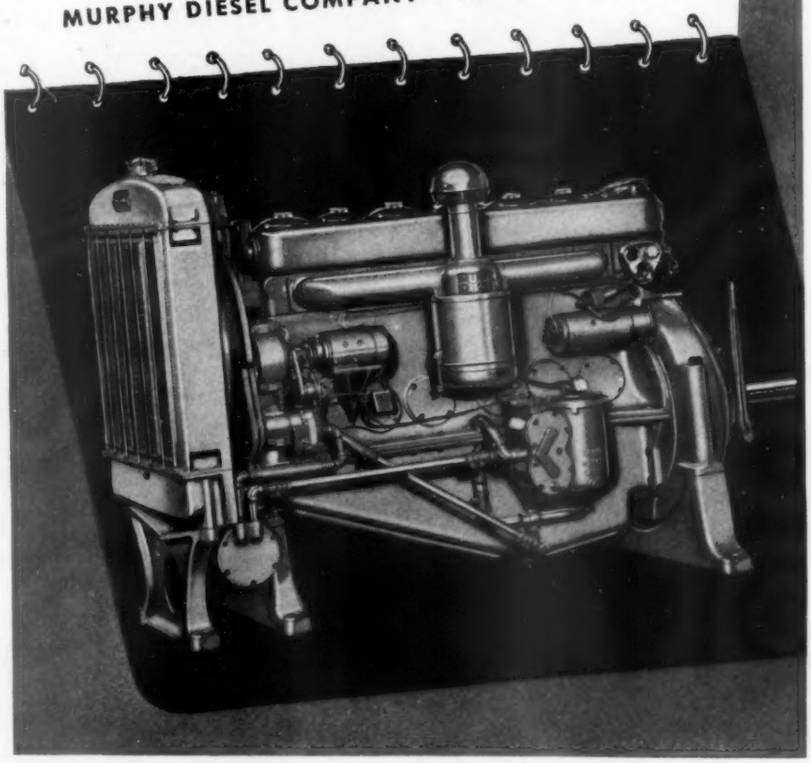


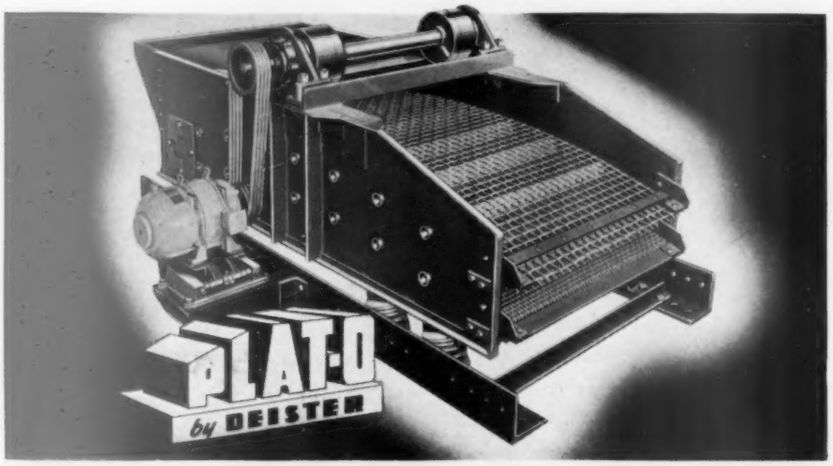
TRAFFIC News Digest

I. C. C. Reports

Fluxing Material. — Rates made 80 per cent. of the lime basis, for application on fluxing materials, have been proposed by Examiner A. G. Hagerty in I. and S. No. 5050, Roasted Calcite, West Virginia and Ohio to Official Territory. The report also includes No. 28666, Ohio Calcium Company, Inc. *v.* Baltimore & Ohio, *et al.* Dismissal of the formal complaint was recommended by the examiner.

Official territory lines, in the schedules under suspension, proposed to establish on ferro-calcite from Lawrence, Ohio, and on roasted calcite from Martinsburg, Millville and Engle, West Virginia, to steel- and iron-making points in their territory, rates the same as those on lime, for a minimum of 50,000 pounds. In the complaint case the complainant alleged, in substance, that the present rates from Lawrence to steel- and iron-manufacturing points on roasted ferro-calcite were unreasonable and unduly prejudicial to the extent that they exceeded lower commodity rates in effect concurrently on roasted calcite from West Virginia origins. It was found by the examiner that the testimony in the formal complaint case did not warrant anything other than dismissal, his conclusion being that the proof did not sustain the allegations. He also said that the suspended schedules should be ordered cancelled without prejudice to the establishment of rates on the basis therein proposed which was 80 per cent. of the lime basis for application throughout official territory.

Plaster Rates in New York.—Examiner C. E. Stiles, in a report in fourth-section application No. 19200, Plaster and Related Articles in New York, has recommended that the commission deny railroads fourth-section relief to establish and maintain a rate of $2.75 per net ton on plaster and related articles from Wheatland, New York, to New York City, and New York harbor lighterage points served by them and certain connections. This rate for application during the navigation sea-



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Constant repeat orders from satisfied customers is one of the surest indications that Deister Plat-O Vibrating Screens are demonstrating their ability on the job, to accurately grade more tons per hour at a lower cost per ton.

Elmer Hirschfeld of the Quality Sand and Gravel Company, Wapakoneta, Ohio, says of his Deister Plat-O Screens, "Separation is very accurate. There is no transmitted vibration. Deister Screens are easier and quicker to change . . . their operation is dependable."

Simple design and rugged, all-welded construction . . . fully cushioned vibration . . . only two bearings . . . positive automatic screen cloth tension, are your assurance of dependable, day in and day out, 'round the clock operation to meet emergency schedules. Most sizes are still available from stock . . . better write or phone the Deister Machine Company today.

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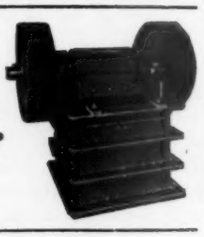

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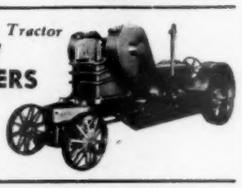
JAW CRUSHERS
Ideal for maintenance road work



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Stationary or Portable
Adjustable
Crushes Large Stone to 2" minus Down to Agricultural Dust
Built In (8 sizes)

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son on the New York State Barge Canal from April 1 to November 30 of each year. The Hedger Transportation Corporation, which operates barges on the canal and the Hudson River, the United States Gypsum Company, the Certainteed Products Corporation, the National Gypsum Company, the Celotex Company, and the chambers of commerce of Jersey City, New Jersey, and Yonkers, New York, opposed the relief sought. According to the report, the purpose of the proposed rate was to meet railway, waterway and truck-waterway competition *via* Rochester, New York, and the canal-river route. It was said no evidence was presented of any truck competition. The report said that the Ebsary Gypsum Company, with a plant at Wheatland and distributing facilities in New York, intervened in support of the application. It had advised applicants, the report said, that if the $2.75 rate was published, the rail routes would be favored with a fair share of the traffic. The examiner said the commission should find that applicants had not made out a special case warranting authorization to charge less for longer than for shorter distances for the transportation of the articles herein considered.

MOTOR REPORTS

Bloomington, Indiana.—MC 16903, Sub. 2. Moon Freight Lines, Inc., extension—special commodities. Examiner Reece Harrison. Dismissal of application for a certificate proposed at applicant's request. Stone from points in Indiana to points in Arkansas, Delaware, Iowa, Kansas, Missouri, Minnesota, Michigan, Maryland, New Jersey, New York, North Carolina, Pennsylvania, North Dakota, Nebraska, South Dakota, Oklahoma, Wisconsin, West Virginia, Kentucky, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Illinois, and District of Columbia. Also brick and tile, from points in Indiana to points in Illinois, Kentucky, Michigan and Ohio.

Osborn, Ohio.—MC 103336. Leon Weiss, contract carrier. Permit proposed. Cement in bags and in bulk from points in Bath Township, Greene County, Ohio, to points in Campbell and Kenton Counties, Kentucky; also empty cement bags and damaged or rejected shipments on return to points in Bath Township.

Centerville, Maryland.—MC 103284. Royden N. Powell, Jr., Common-carrier application. Certificate proposed. Lime from points in Pennsylvania to points in Maryland; fertilizer from Philadelphia, Pennsylvania, and Wilmington, Delaware, to points in Maryland; agricultural commodities, points in Mary-

190,000 Tons of Aggregates Pumped in 1941 by 8-inch Amsco pump with Minimum Repairs

The Dallenbach Sand & Gravel Company, Milltown, New Jersey, producers of commercial concrete aggregates, enthusiastically commend the satisfactory performance of their Amsco Dredge Pump equipment. 190,000 tons of deposit materials were excavated during the 1941 season, of which 150,000 tons of sand and 15,000 tons of gravel were saleable and the balance wasted. An 8" Amsco, Type "M", Form 30, heavy duty dredge pump, directly connected to a 100 H.P., General Electric, 580 R.P.M., slip ring motor, is used for production. The average discharge pipe line is 500 feet, together with 30-foot terminal lift at the shore plant emptying position. Two years' results establish about 100 tons an hour average production, a commendable performance in that only a plain suction line is used and some areas of the deposit are tightly compacted.

Should future field conditions warrant longer discharge pipe line lengths coupled with higher head pump characteristics, the equipment is designed for ready adaptation of an Amsco "COUNTERFLOW" water end in conjunction with using a larger motor of 150 H.P. size at 705 R.P.M.

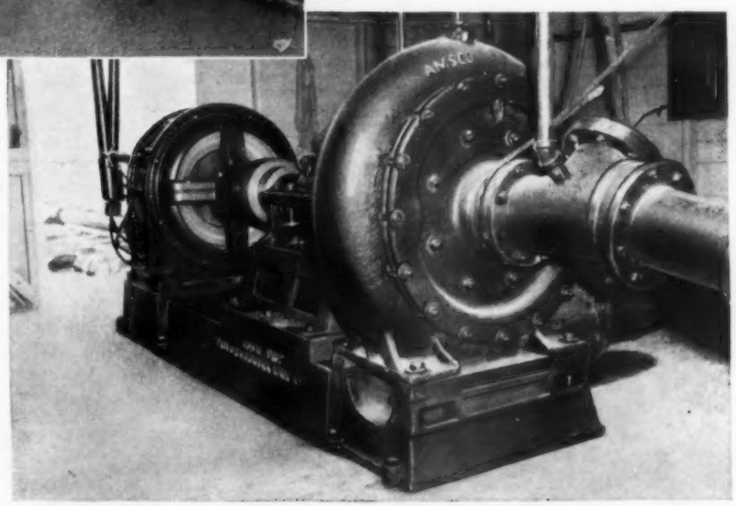
Continuous use of this equipment has demonstrated a minimum cost of maintenance parts and labor, together with optimum productive operating hours. Similarly, Amsco Dredge Pumps in hundreds of installations, over many years, have given satisfactory service, under every kind of working condition, at lowest cost per ton of material handled. Amsco Pumps evidence their ability to stand up when being pressed the hardest for production. It is thus that they have proved their superiority as users of Amsco Pumps will tell you.

Made of genuine 13% manganese steel throughout the water end, including the shell, impeller, side plates and liners, Amsco Dredge Pumps insure utmost resistance to impact and abrasion.

They embody sturdiness with rigidity of construction; heavily proportioned shafting and bearings; accessibility and quick, positive impeller adjustment; easy replacement of wearing parts; simple lubrication; highest maintained efficiency; and remarkably high capacity handled against high heads.

The toughness and wear hardness of Amsco Manganese Steel make it ideal, also, for Rotary Cutters; and Dredge Pipe Line Fittings such as elbows, pipe, nipples, reducers, expansion joints, hose nipples, and flap valves.

Send for bulletins showing various types of pumps for sand and gravel production, rotary cutters and material handling pipe line fittings.



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GRINDING JOB
USE
THE HARDINGE
CONICAL MILL AND
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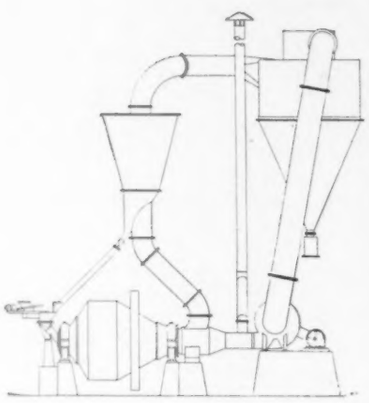

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land to Philadelphia, Pennsylvania, Wilmington, Delaware, and Norfolk, Virginia.

Elgin, Illinois.—MC 69649, Sub. No. 2. Fred A. Hanson, common-carrier extension. Joint board 13. Certificate proposed. Building stone from points in Milwaukee, Waukesha and Walworth Counties, Wisconsin, to points in Boone, DeKalb, DuPage, Cook, Kane, Kendall, Lake, McHenry and Will Counties, Illinois, over irregular routes with no transportation for compensation on return.

CENTRAL FREIGHT ASSOCIATION

Docket 70062. (Carrier's proposal) Limestone, agricultural, carload. Cancel all rates on, from Hillsville, Shaw Junction and Walford, Pennsylvania to points in Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri and Wisconsin, published in P. & L. E. Tariff I. C. C. 3301, and similar rates in other individual lines' tariffs, account obsolete.

Docket 70064. (Shipper's proposal) Sand, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding and polishing, loam, molding or silica, and gravel, in open-top cars, carload. Establish a rate of $1.05 per net ton from Lafayette to Dana, Indiana.

Docket 69939. (Shipper's proposal) Dolomite, roasted, refractory dolomite, in granular form, treated or untreated, clinker or burned to a dead state, carload, minimum weight 80,000 pounds. Establish a rate of 27 cents from Maple Grove and Narlo, Ohio, to Duluth and Steelton, Michigan, *via* routes over which the present rate applies.

Docket 70097. (Shipper's proposal) Crushed stone, in bulk, in open-top cars only, and crushed-stone screenings, in bulk, in open-top cars, carload. Establish a rate of $1.60 per net ton from Maple Grove and Narlo, Ohio, to St. Louis, Michigan.

Docket 70379. (Shipper's proposal) Sand, all kinds, and gravel, in open-top cars, carload. Establish a rate of $1.05 per net ton *via* the B. & O.—Canton—P. R. R. from Botzum to Columbiana, Ohio. Subject to Ex Parte 148 increase.

Docket 70316. (Shipper's proposal) Agricultural limestone, unburned, not ground or pulverized, in bulk in open-top cars, only, carload, minimum weight 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity the actual weight will apply. Establish a rate of $1.10 per net ton from Narlo to Denson, Ohio.

High-Capacity
Screens
• Designed especially for damp, sticky, and fibrous materials—Speeds up production!
The W. S. TYLER Company
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IT COSTS NO MORE — TO USE THE BEST
REPLACE WITH
"Indian Brand"
MANGANESE STEEL
LONG LIFE
ABRASION
RESISTING PARTS
FOR
QUARRY, ROAD,
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AND
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ESTABLISHED 1881

LABOR DECISIONS

Monopoly

Allen Bradley Co., et al. v. Local Union No. 3, International Brotherhood of Electrical Workers, et al., decided by the U. S. District Court, Southern District of New York (by special master), September 30, 1941; reported at 41 Fed. Supp. 727.

The plaintiffs in this suit are a group of manufacturers of electrical equipment, who sued to obtain a judgment declaring that the defendant union, in conjunction with electrical contractors and manufacturers of electrical goods and appliances in New York City, had violated the Sherman Anti-Trust Act, and to enjoin the union and others from barring products of the plaintiffs from entering into the installation of electrical equipment in New York.

According to the court's summary, the union, by the exercise of its economic force, has unionized the entire industry of large-scale installation of electrical equipment in New York City and the factories in New York City which produce certain types of essential electrical equipment. "The electrical

IN Greek mythology there was no greater troublemaker among the deities than Pan. His abrupt appearance among the timid wood nymphs inspired the greatest fright. He was regarded also as inspiring human beings with groundless terror. To denote this fear the Greeks created from the name of this dreaded god the word *panikon*. English has taken it over as *panic*. This is one of thousands of interesting word origins given in the unabridged Merriam-Webster, WEBSTER'S NEW INTERNATIONAL DICTIONARY, Second Edition. This great reference book contains 600,000 entries — 122,000 more entries than any other dictionary. 12,000 terms illustrated; 3,350 pages.

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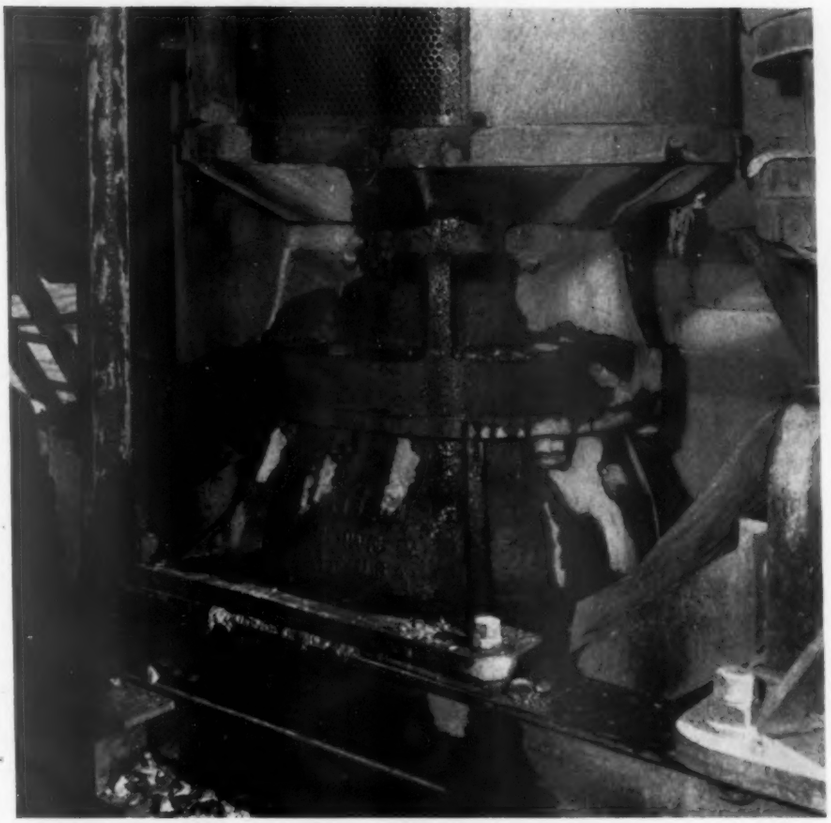

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contractors who employ members of the union are united in associations. The manufacturers are members of an association. The union has brought about a joint arrangement through the coöperation, voluntary or forced, of the contractor groups and the manufacturing group with the union, whereby certain types of electrical equipment made by the local manufacturers are the only articles of that type permitted to be installed in electrical construction work in New York City. The natural and necessary effect has been to restrict the market, raise the cost to contractors, builders, and ultimately the community, and to create a barrier which excludes from installation in New York City similar products made by the plaintiffs, which were formerly widely sold in New York City through interstate commerce, for use in building construction here."

The court holds that the declaratory judgment and injunction are justified, notwithstanding the Norris-LaGuardia (Anti-Injunction) Act. "The Norris-LaGuardia Act was specifically intended to protect the normal activities of working men, in forming a union and acting together to further their interest as members of the union, from being regarded, solely for that reason, as constituting a conspiracy, even though their activities might to some extent affect interstate commerce.

"When such a union, reaching such power as this union has, can persuade contractors and manufacturers to join with it in a plan as a direct result of which certain products previously freely entering into interstate commerce for use in New York City are barred therefrom because the contractors will order no such goods except from the local group, it comes with ill grace for it to claim the right to proceed without restraint from the courts while, concededly its co-conspirators (the manufacturers and contractors) are subject to such restraint.

"In the light of these considerations, and in the light of the declaration of the public policy in Section 2 if the Norris-LaGuardia Act, it must be concluded that the controversy involved in the case at bar is not what can fairly be called a 'labor dispute' within the terms of the Norris-LaGuardia Act."

Utterances of Employer

National Labor Relations Board v. Virginia Electric & Power Co., etc., decided by the U. S. Supreme Court, December 22, 1941; reported at 62 S.Ct. 344.

The record in this case left the Supreme Court uncertain whether certain utterances of the employer (a bulletin and certain speeches to employees) were

considered by the National Labor Relations Board to be "coercion" in themselves, or whether the finding of "Coercion" was based upon such utterances by reliance on the surrounding circumstances.

On this point, the court remarks that neither the National Labor Relations Act nor the cease-and-desist order the board entered in this case enjoins the employer from expressing its views on labor poblems or policies. "The sanctions of the act are imposed not in punishment of the employer but for the protection of the employees. The employer in this case is as free now as ever to take any side it may choose on this controversial issue. But certainly conduct, though evidenced in part by speech, may amount to coercion within the meaning of the act. If the total activities of an employer restrain or coerce his employees in their free choice, then those employees are entitled to the protection of the act. And in determining whether a course of conduct amounts to restraint or coercion, pressure exerted vocally by the employer may no more be disregarded than pressure exerted in other ways."

In this case, "if the board's ultimate conclusion is based upon a complex of activities, such as the anti-union background of the company, the activities of Bishop [the superintendent], Edwards' [a supervisor's] warning to the employees that they would be discharged for 'messing with the C.I.O.,' the discharge of Mann [an employee who had protested against an 'inside' union], the quick formation of the Independent [the 'inside' union], and the part which the management may have played in that formation, that conclusion would not be vitiated by the fact that the board considered what the company said in conjunction with what it did." However, if the utterances were separated from their background, the court finds it difficult to sustain a finding of coercion with respect to them alone. The case is accordingly remanded to the board for re-determination of the issues.

Election

National Labor Relations Board v. P. Lorillard Co., decided by the U. S. Supreme Court, January 5, 1942; reported at 62 S. Ct. 397.

An order of the National Labor Relations Board requiring the employer to bargain collectively with a union representing the employees was modified by the Circuit Court of Appeals, because of the lapse of time, to require the board to conduct an election to determine whether the union had lost its majority. The board had considered

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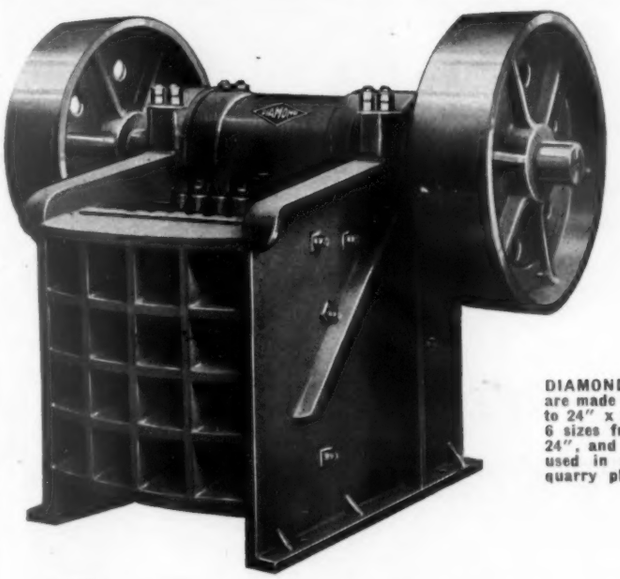
When You Buy a Crusher What Should You REALLY Buy?



DIAMOND Standard Jaw Crushers are made in 13 sizes from 6" x 12" to 24" x 36" and Roll Crushers in 6 sizes from 16" x 16" to 54" x 24", and various sizes of these are used in stationary or portable quarry plants and crushing units.

THESE are the things you should look for and expect in the crusher you buy:

1. A base heavy, rugged and properly reinforced to withstand the hardest crushing operations.
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3. Proper *balance* for easiest running and consequent economy of power.
4. Delivery of *full* capacity.
5. Construction primarily based on the hardest type of crushing.

Don't buy on claims unless those claims can be thoroughly backed by performance records. And speaking of records, DIAMOND has some recent and very outstanding ones we're anxious to talk about. Either we, or any of our dealers will tell you all about it. In fact, we'd like to consult with you on *any* crushing, screening, conveying or elevating problem you have.

WRITE US or contact our nearest dealer for full details of DIAMOND ROCK, SAND AND GRAVEL EQUIPMENT. Free bulletins on request.

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MODEL 51

BLAST HOLE DRILL

WELDED and RIVETED

In steel fabrication some say one thing and some say another.

Keystone by-passes the argument by employing *both* methods in the construction of well drill frames, which are welded *and* riveted.

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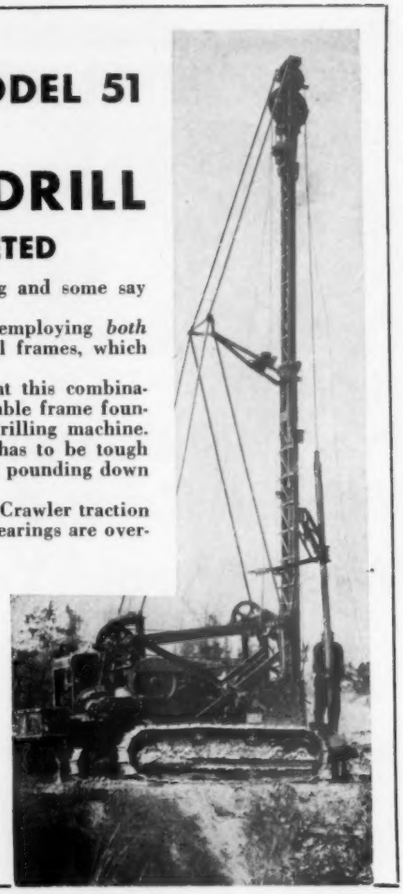
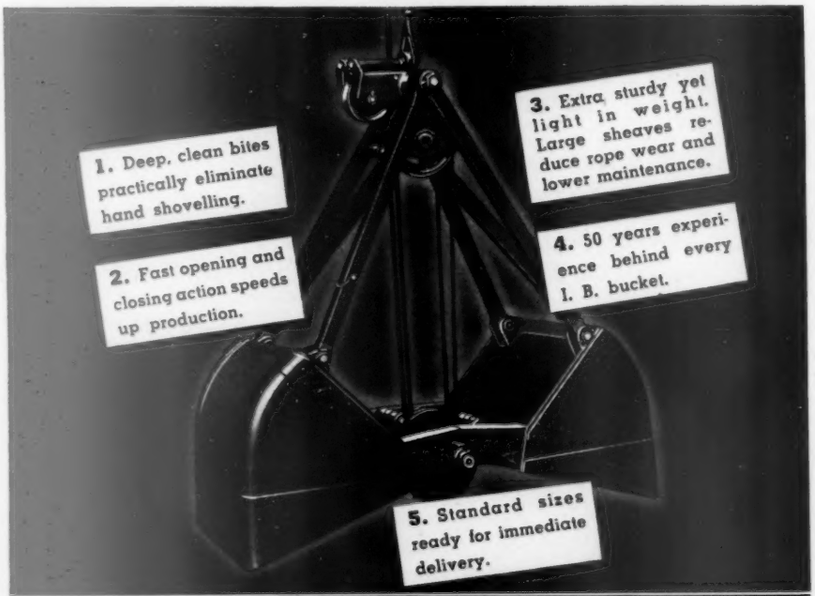
Other details of the design of Model 51-Crawler traction quarry drill are in keeping. Shafts and bearings are oversize. Structural members are of ample form and section dimensions. Bearings are of anti-friction type. The length and character of the drilling stroke are adjustable to give greatest efficiency. Model 51 is a modern, stream-lined rock borer — the latest product of an old and well known shop.

You will want to know more about it. Ask for bulletin BD-142.



KEYSTONE DRILLER COMPANY
Beaver Falls, Pa.

5 REASONS WHY PRODUCTION-MINDED MANUFACTURERS DEMAND I. B. BUCKETS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4. 50 years experience behind every I. B. bucket.
5. Standard sizes ready for immediate delivery.

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the effect of a possible shift in membership, alleged to have occurred after the employer's unfair labor practice, but it had concluded that in order to effectuate the policies of the National Labor Relations Act, the employer must remedy the effect of its prior unlawful refusal to bargain by bargaining with the union shown to have had a majority on the date of the employer's refusal to bargain. "That," says the Supreme Court, "was for the board to determine, and the court below was in error in modifying the board's order in this respect." The appellate court is therefore reversed with directions to enforce the order of the board.

Wage Reduction

Tinerella, et al. v. Des Moines Transp. Co., Inc., decided by the U. S. District Court, Northern District of Illinois, Eastern Division, October 13, 1941; reported at 41 Fed. Supp. 798.

In this suit for wages allegedly due under the provisions of the Fair Labor Standards Act of 1938 the court holds that the provision of Section 18 of that act that no provision of the act should justify an employer in reducing a wage does not entile an employee to recover for a reduction of wages if the wages actually paid are above the minimum fixed by the act. The court does not understand that the effect of that provision "is to stabilize the wages paid by employers at the time the act became effective or to prevent the employer from reducing the wages then being paid, provided he keeps within the limits prescribed by the act."

A claim for unpaid overtime is denied on the ground that the Fair Labor Standards Act does not regulate the hours of labor of employees whose duties affect the safety of operation of motor vehicles in interstate commerce, subject to regulation by the Interstate Commerce Commission.

Unlawful Picketing

R. H. White Company v. Murphy et al., decided by the Supreme Judicial Court of Massachusetts, January 2, 1942; reported at 38 N.E. (2d) 685.

From fear of labor trouble the employer involved in this case signed a closed-shop contract with two A.F. of L. unions with which it had previously had contracts, even though it knew that proceedings for certification of a collective-bargaining agency for the employees were then pending before the Massachusetts State Labor Relations Commission. The commission subsequently certified that at an election held for the purpose a majority of the employees had selected a C.I.O. union, and

that that union was their representative for purposes of the State Labor Relations Law (General Laws, Chapter 150A; Chapter 345, Laws of 1938). The A.F. of L. unions picketed the place of business to enforce their closed-shop contract, and were enjoined from so doing by the Superior Court, from which this appeal is taken.

The Supreme Judicial Court holds that the policy of the State Labor Relations Law is the same as that of the National Labor Relations Act, and that a contract entered into between an employer and a union claiming to represent the employees would not necessarily settle the question of the proper exclusive bargaining representative of the employees, since under the statute it is the employees who are to settle the question. To conform to the demands which the A.F. of L. unions sought to enforce by picketing, the employer would have had to engage in an unfair labor practice as defined by the statute, to discharge employees and bargain with those unions under a contract which was ineffective, and to refuse to bargain with the certified representative of the employees. The picketing, therefore, was for an unlawful purpose, and the trial court was correct in issuing an injunction to prevent it.

Local Business

National Labor Relations Board v. Niles Fire Brick Company, decided by the U. S. Circuit Court of Appeals, Sixth Circuit, December 5, 1941; reported at 124 Fed. (2d) 366.

It was claimed that the respondent company was not within the jurisdiction of the National Labor Relations Board because its business is of such a nature and its shipments of raw materials from Pennsylvania, together with its commerce from Ohio outside the state, are so small that it cannot be said to be engaged in interstate commerce within the meaning of the National Labor Relations Act. But the fact that its business is localized within a certain area in two adjacent states, says the court, or that it could have secured its raw materials from within the state of Ohio, "does not militate against the interstate nature of its commerce". "It was, in fact, substantial; and it crossed the state boundaries. This constituted interstate commerce, and, under the admitted fact, was sufficient to give jurisdiction to the board, within the intendment of the statute."

A cease-and-desist order is upheld because the board's findings were supported by substantial evidence. The board concluded that the employer failed to deal with an outside union because of hostility to an outside union, and that an inside union had been

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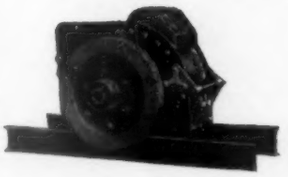

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The HAISS "75" is everybody's idea of what a stockpile loader should be. Fast. Mobile. Rugged. Simple. Economical. Write for catalog.

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brought into existence wth the powerful assistance of the employer's known hostility. "No dues were ever collected by the independent; the organization incurred no expenses during the seven months' period of its existence; up to the time of the hearing, no grievances were ever presented, nor was any proposed contract submitted, and its organization was sketchy and ineffective. From the foregoing, and in view of the evidence, it appears that the board was justified in concluding that the independent union was inherently incapable of functioning as a real bargaining agent or an independent representative of the employees."

RESERVES PLANT FACILITIES

The Lime & Hydrate Plants Company and the McGann Manufacturing Company of York, Pennsylvania, designers of lime plants and builders of complete lime plants in their own shops, have announced that they have reserved a portion of their manufacturing facilities, apart from their defense activities, in order to be in a position to meet the needs of the lime industry.

Trade Literature

FASTER, SAFER MATERIALS HANDLING. (Catalog 501.) 160 pages. Barrett-Cravens Company, Chicago.

KRON BATCHING SCALES FOR CONCRETE-ASPHALT. (Bulletin H200.) 4 pages. The Kron Company, Bridgeport, Connecticut.

KORPAK . . . CORE PACKING BLOCK MACHINE. 16 pages. W. E. Dunn Manufacturing Company, Holland, Michigan.

SUPEROCK . . . THE IDEAL LIGHTWEIGHT AGGREGATE. 40 pages. SupeRock Company, Birmingham.

VARI-PITCH TEXROPE SHEAVES. (Bulletin 6082-A.) 16 pages; ELECTRIFUGAL AND SS UNIT PUMPS. (Bulletin B6018.) 36 pages. Allis-Chalmers Manufacturing Company, Milwaukee.

HARDINGE THICKENERS AND CLARIFIERS. (Bulletin 31B.) 4 pages. Hardinge Company, York, Pennsylvania.

GRACO INDUSTRIAL LUBRICATING EQUIPMENT. 20 pages. Gray Company, Minneapolis.

KOTAL WATERPROOFING FOR BETTER BITUMINOUS PAVING. 12 pages. Kotal Company, New York.

GAR WOOD HYDRAULIC CONTROL UNIT. 6 pages. Gar Wood Industries, Detroit.

BELT CONVEYORS BY CONTINENTAL. (Bulletin ID-103.) 4 pages. Continental Gin Company, Birmingham.

MAXI ONE-MAN CRANE UNDER-CARRIAGE. (Bulletin CU-142.) 4 pages. Six Wheels, Inc., Los Angeles.

ARE YOU MIXING TOO MANY DOLLARS IN YOUR CONCRETE? 8 pages. Scientific Concrete Service Corporation, Washington, D. C.

LETOURNEAU EARTH MOVING EQUIPMENT—1942. Catalog A-276.) 32 pages. R. G. LeTourneau, Inc., Peoria, Illinois.

HOW TO SAFELY STRETCH STEAMING CAPACITY. (Bulletin 16.) 20 pages. Bailey Meter Company, Cleveland.

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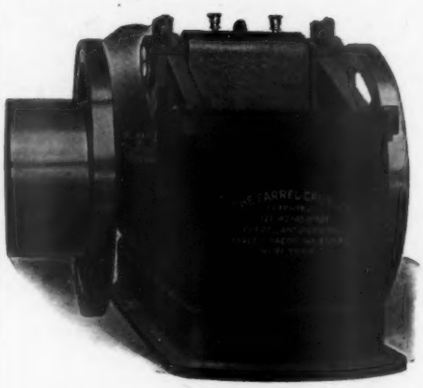
Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



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May, 1942

The CONCRETE MANUFACTURER

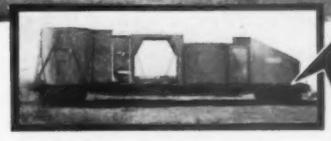
A Special Section of ... JANUARY

JOHNSON CEMENT PLANTS

SPEED
PORTABILITY
ADAPTABILITY

NOW! MORE IMPORTANT THAN EVER BEFORE—time and labor saving features, fast efficient operation, and adaptability to any construction need or situation must be present in all construction equipment.

- ★ Only two men needed on Johnson cement plants—with hopper-bottom car or bulk truck cement delivery.
- ★ 120 batches or 200 barrels of cement can be batched per hour through any Johnson Cement Plant with manual control.
- ★ Bulk trucks, truck mixers, or both can be charged through Johnson Cement Plants.
- ★ Johnson Cement Plants are adaptable for box car, hopper bottom car or bulk truck cement delivery.
- ★ All Johnson Cement Plants are quickly and easily convertible from batching plants to transfer plants or vice versa. Transfer plants have 250 barrel per hour capacity.
- ★ Johnson Cement Plants are really portable—Elevating Charger, Dutchmill and Portable Section Cement Bins can be completely erected or dismantled by three men in two hours' time.
- ★ Elevating Charger is economical with bag cement—elimination of split sacking and much labor, plus faster batching time for both batch trucks or truck mixers are possible.



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JOHNSON CEMENT PLANTS MEET ALL REQUIREMENTS AND THEN SOME

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JOHNSON CEMENT PLANTS ARE AVAILABLE WITH CEMENT STORAGE CAPACITY FROM 25 TO 7000 BARRELS

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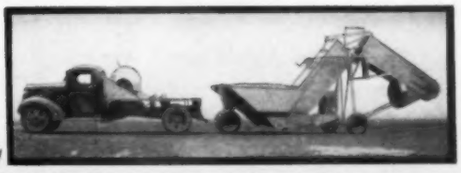

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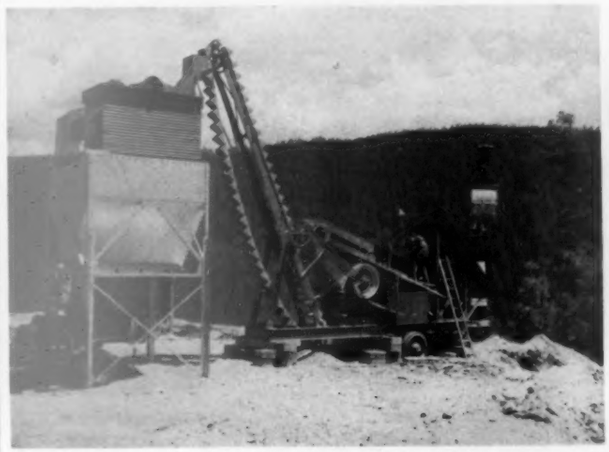

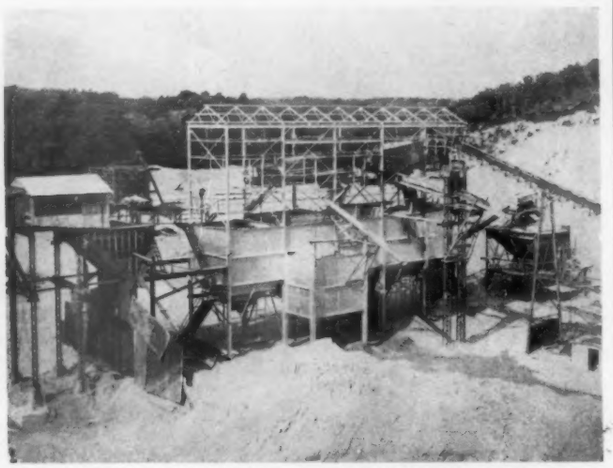

From Crusher to Concrete

BUTLER PLANTS PLAY AN ESSENTIAL PART

From the smallest crusher plant to the largest ready-mixed concrete or central mixing plant, Butler equipment has a vital role in America's Victory Program. Butler plants are at work twenty-four hours a day from Samoa to Greenland building air bases, drydocks, munitions plants, army camps, airplane factories, and many other projects necessary for the war effort.

Whatever your requirements, Butler engineers are equipped to solve your plant problems, for behind them lie twenty years' experience in the field and hundreds of successful installations. For your next defense job, be sure to consult our engineers, and let them show you how to do the job faster, more efficiently, and for less money. Write today to—

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The CONCRETE MANUFACTURER

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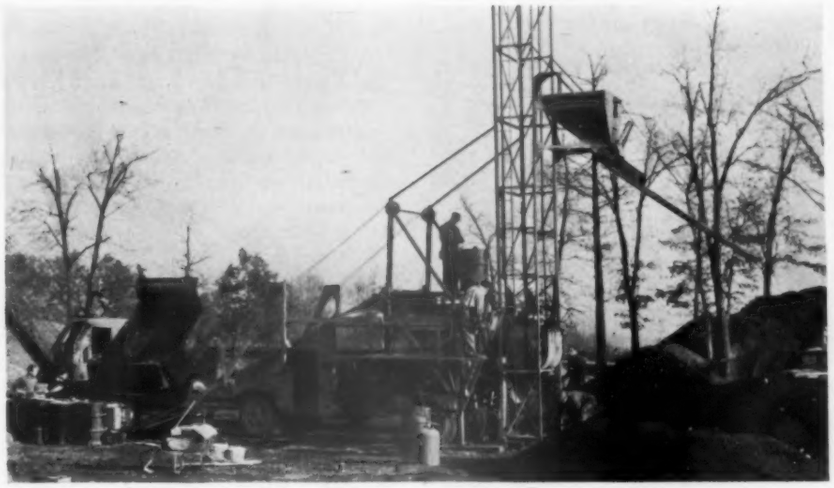

Mobile mixing unit of C. W. Blakeslee & Sons building up a stock-pile.

Portable Concrete Plant Prepares Asphalt Mix

Recent events have emphasized the importance of constant maintenance of roads and highways particularly those giving access to airports and other military establishments, and equally to airport runways themselves.

Whether traffic and weather, or bomb craters be to blame for damage, the roads must be open to "keep 'em rolling" and the runways must be in order to "keep 'em flying."

Construction and maintenance men have long sought a satisfactory method of stock-piling a "ready-to-use" asphalt mixture particularly during the winter season, as piles of such a mixture stored at convenient points and requiring no further treatment before use would greatly speed repair jobs that must be undertaken when most mixing plants are shut down.

A very timely success with asphalt stock-piles has recently been achieved at the plant of C. W. Blakeslee & Sons, Inc., of New Haven, Connecticut, by the Kotal Company. A 2,000-ton pile was made up in the fall and used effectively through the winter and spring. This mixture made with Kotal, a waterproofing agent for paving aggregates, remained pliable and workable all through the winter and yet set promptly on laying. Despite low temperature and bad weather, it was always possible to use this mixture whenever it was wanted by municipalities and utilities.

Blakeslee & Sons are now producing this mixture in a Mixermobile and have completed a 3000-ton stock-pile for their own winter use, using an MC asphalt with undried crushed stone. The mixture may also be made with graded gravel. The company is making its Mixermobile available on a rental basis to others within a reasonable range of their headquarters at New Haven.

Cincinnati Operator in New Plant Building

A new one- and two-story structure to provide increased space for manufacturing operations, office and storage for Cinder Products, Inc., Cincinnati, is in the course of construction, Edgar M. Johnson, president, reports:

Re-location of the plant was necessary because former quarters in the old Pollak steel plant in suburban Carthage have been taken over by the Ridgewood steel-forge plant for war production.

The Cinder products company's new plant is scheduled to be completed by May 1. Eight-hour capacity will be approximately 12,500 standard units. The company has supplied units for many defense plants in the Cincinnati area including the War Department's mirror plant at suburban Mariemont; Aeroproducts Division, General Motors Corporation, Dayton, Ohio; General Machinery Corporation's new addition at Hamilton, Ohio; and several buildings at the Wright Aeronautical Corporation plant in Lockland, Ohio. The company's products have also been used at the DuPont smokeless powder plant near Cincinnati.

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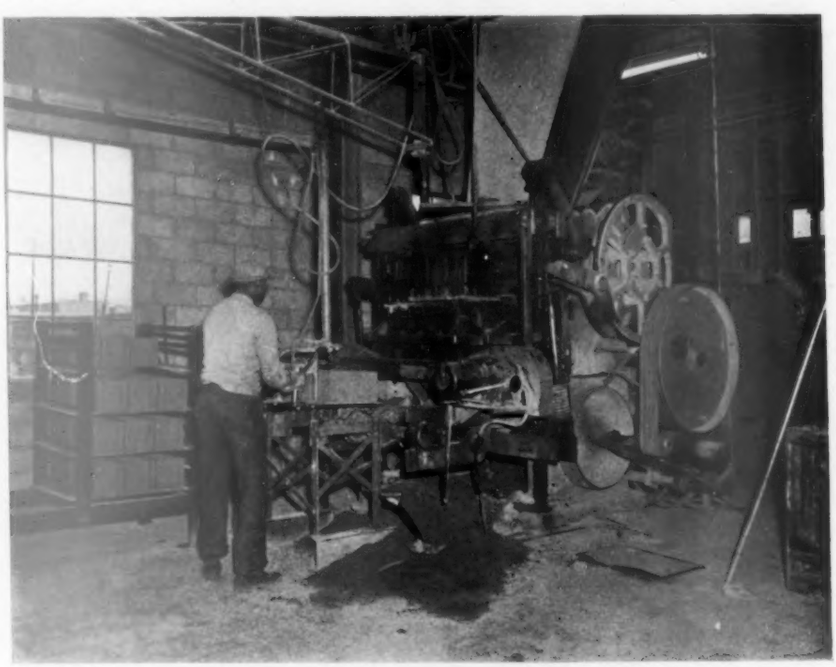
The CONCRETE MANUFACTURER

Trained Personnel Gets the Most Out of This Operator's Modern Machines

The Borin Lumber & Fuel Company plant with kilns and part of storage yard in foreground.

CONCRETE-BLOCK plants are comparatively simple operations with little opportunity for originality in their design and operation. As a result most of them follow a set pattern which has proved its efficiency and economy over a period of many years. It is a real pleasure, therefore, when one encounters a plant like that of the Borin Lumber & Fuel Company in Detroit, Michigan. This plant differs little from the accepted pattern in its general design but incorporates many original refinements and details of design and construction. It is now a single-unit plant but space has been left for a second block machine and mixer and the additional equipment and kilns which would be necessary to double capacity.

Mechanical handling is employed wherever possible with the result that only five men are required to operate the plant. One man does the batching and mixing, one operates the machine, one hauls racks to and from the machine and kilns, one hauls away and piles the cured blocks, and one takes care of the aggregates unloading and does general clean-up work. The fourth-mentioned worker is a specialist who is able to pile the output of the plant only by eliminating all waste motion. The others are all trained to be interchangeable on the other four jobs.



The vibrating block machine with off-bearer and steel rack at left. Bulk-cement elevator is in background.

The plant was designed by the Besser Manufacturing Company in coöperation with Eugene Tamm, superintendent, and the Palmer-Bee Company, which supplied the conveyors, elevators, weigh-larry, etc. Mr. Tamm is also responsible for most of the original methods used. He has been in the concrete-block business since 1929 and learned it from his father who has been active in block production since 1907.

Sam Borin, owner of the Borin Lumber & Fuel Company, is also vice-president of Borin Brothers, Inc., operators of nine yards in Detroit dealing primarily in coal and ice. The company

By W. E. TRAUFFER

was formed in 1937 to deal in lumber, coal, building material and supplies, etc., from a yard at 14210 West Chicago Avenue, a rapidly-growing residential neighborhood. Concrete blocks were sold and the growing market for them was responsible for the building of the company's plant which went into operation in June, 1941. More than a million blocks have been made already and their manufacture is now the company's most important line of business. The plant was operated two shifts daily until cold weather set in.

In building this plant no reasonable expense was spared to insure efficient and low-cost production. In operating it the quality of its products is the primary consideration. W. Borin, general manager and a son of Sam Borin, is proud of the fact that about half of the steady business is from unsolicited customers attracted by the reputation for quality that has been built up. Considerable newspaper advertising is done but no salesmen are employed.

The three aggregates used in this plant are pea gravel and what are known locally as flat and sharp sands. These are handled and stored separately and are recombined by weight in the desired proportions. Fineness-modulus tests are made monthly or oftener if necessary and the quality and gradation of the aggregates are watched carefully.

These precautions have resulted in an increase in the compressive strength of the blocks and in greater uniformity.

High-early-strength cement is used exclusively, a practice which is becoming popular in this area because of its several advantages. In Detroit high-early-strength cement costs about 25 per cent. more than standard Portland cement but in this plant it has increased the yield from 30 to 35 per cent. Thirty 8- by 8- by 16-inch blocks are obtained per sack of cement. These blocks can be handled safely after 6 hours of steam curing and have a compressive strength of 1,100 to 1,200 pounds per square inch at 3 days. Their 28-day strength averages well over 1,600 pounds compared to the 750-pound code requirement. The higher early strength obtained with this cement is also an advantage during seasons of great demand when double-shift operation taxes

The 40-cubic yard mixer with traveling weigh-larry and fluorescent lights above.

the capacity of the curing kilns. Its advantages for cold-weather operation are obvious.

The aggregates are received in trucks from which they are discharged over a bar grizzly into a 16-cubic yard steel hopper. Under the hopper is a 20-inch by 16-foot inclined belt-conveyor from which the material goes to a steel-inclosed belt-bucket elevator. The elevator discharges this material at an elevation of 60 feet above ground level on a short horizontal belt-conveyor which discharges it direct into one 60-ton steel bin or by means of a plow into two others. The first conveyor has flat carrying rollers instead of troughing idlers and the aggregates are kept from spilling by skirt boards with rubber flaps. This construction eliminates the stretching of the belt which occurs when troughing idlers are used on a short conveyor. The elevator has a removable plate near the bottom through

Left to right: W. Borin, general manager; P. M. Park, Besser vice-president; Eugene Tamm, plant superintendent; E. Gudmundson, a visitor from Iceland; A. H. French, Besser factory representative.

which the belt and buckets can be inspected or taken out for repair or replacement.

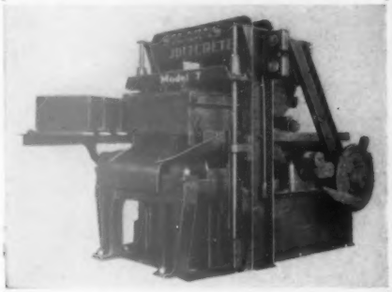
The high-early-strength cement is received in special self-unloading bulk-cement trucks which haul from 75 to 135 barrels per load. These trucks are backed in a side door of the main plant building and the cement is discharged from their unloading screws into the hopper of a steel-inclosed bucket-elevator. The cement is discharged through a spout into a 275-barrel steel bin.

The three aggregates are discharged through two gates under each bin into a 40-cubic foot Palmer-Bee traveling weigh-larry which is equipped with a Fairbanks dial scale. The cement is discharged into the larry through a plug-type Palmer-Bee valve. The aggregates and cement are discharged from the larry into the 40-cubic foot Besser mixer where they are mixed dry for about 3 minutes while the operator is loading another batch of aggregates into the larry. Water is then added and the concrete is mixed for about 3 minutes more while the operator is weighing out the cement for the next batch. This system has worked out very well and insures a steady supply of concrete for the block machine.

The concrete is discharged into an 80-cubic foot hopper over the Besser Super Vibrapac block machine which produces an average of 4,600 standard blocks in an 8-hour day including all delays. As many as 4,800 blocks have actually been produced in this period. A Besser air-operated off-bearing hoist is used to transfer the blocks to Chase steel racks. All this equipment is of standard design except the racks. These have hinged shelves for the pallets which are ordinarily left down all the time. When a new man is being broken in on this job the shelves are lifted back out of the way until needed to prevent damage to the green blocks by bumping against them. After a day or two an operator becomes expert enough to slip the blocks into place with the shelves down. This feature has been important because of the high labor turnover due to the draft, defense work, etc. The air is supplied by a small Gardner-Denver compressor.

Steel rack with hinged shelves shown folded back while an operator is learning to use the off-bearer.

The Vibration Machine Supreme



Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

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The loaded racks are hauled by Yale & Towne hand-operated lift trucks into the four 11- by 68-foot kilns. These are built of concrete blocks and each holds 33 racks or 1,980 standard blocks. Metal doors are used at both ends; those at the loading end swing up out of the way; those at the unloading end are hinged at the sides. Each kiln is equipped with a Maxon Premix gas burner at its outer end which draws air from the outside through an opening in one of the doors. At the end of the burner is a fog nozzle which shoots the moisture into the flame. The temperature inside the kiln is kept near 80 degrees F. as higher temperatures have been found inadvisable when using high-early-strength cement. The humidity varies with the stages of curing of the concrete but averages about 90 per cent. In freezing weather it is not wise to take wet blocks outdoors so they are first air dried. This is done by opening the inner doors of a kiln and turning on the heater fan without the heat or spray. In an hour the blocks are dry enough for safe storage outdoors.

After 6 hours of kiln-curing a Clark Truclift gasoline lift truck is used to transfer the blocks to outdoor storage and to return the empty racks to the plant. A second Truclift is used when the plant is being operated two shifts daily, and a third is kept in reserve.

The outside storage yard consists of

A trailer-load of aggregate being discharged into plant hopper.

a concrete area 140 feet wide and 210 feet long. With blocks piled 10 high its capacity is about 250,000 units. This area is separated from the plant by a driveway which is too narrow for delivery trucks, thus eliminating any danger to lift-truck operators backing out of a kiln. The various specials produced are piled in sections along one side and the far end of the concreted area where they are accessible for truck loading. The 8-inch blocks are piled in the center of the area and a driveway is left between these and the specials for the lift trucks. The 12-inch blocks are stored at the opposite side of the area and piles are also built up from the outside in. A driveway is always left open between the 8- and 12-inch blocks.

With this arrangement it is easy to make sure that the oldest blocks are loaded out first. Each truck driver loads his own truck and makes his load of 400 eight-inch or 275 twelve-inch

Power lift truck being used under winter conditions.

blocks in about a half hour. The trucks are loaded only 4 rows wide so that the truck driver can do all the loading from one side, eliminating the rehandling, extra steps, or turning of the truck necessary when piling 5 or more rows wide. The company owns six Dodge 2-ton flat-bodied delivery trucks and in rush seasons additional trucks are hired.

In winter operation the aggregates are sometimes received in a frozen state. A Kewanee 25-horsepower coal-fired boiler supplies steam at 15-pound pressure to perforated steam pipes in the bottom of the aggregate-receiving hopper a few inches above the conveyor. After a load is dumped into the hopper it is covered with a tarpaulin and any large lumps retained on the grizzly are quickly thawed out. Even under the worst conditions a load of frozen gravel is thawed out and transferred to the plant bins in less than 50 minutes. This boiler also supplies steam for unit blower heaters throughout the plant. A Hobart a.-c. electric welder is used for repairing or building up worn equipment. Fluorescent lighting is used wherever possible.

Looking down on blower and gas burner in a kiln with fog nozzle at right.

Gelbman's Block Plant in Bronx Scene of Early Experiments with Vibration

AT 750 Edgewater Road, near the mouth of the Harlem River in the Bronx, New York, is a concrete-products plant with a historical background which is practically a history of that industry. Though built in 1939, this plant was preceded by others, that dated back to the "Dark Ages" of the industry, and in which was done development work that contributed in large measure to the position the industry now enjoys. This plant is operated by Concrete Units, Inc., of which Louis Gelbman is vice-president.

Before the First World War Mr. Gelbman was a cement mason and during the war he was a naval inspector on concrete-barge construction. After the war was over he started up a small concrete-block plant in Yonkers and this was followed by two others in different locations. During all these years Mr. Gelbman was not satisfied with the equipment then available but it was not until 1926 that he began to take steps to improve this situation. After some experimentation he built his first machine, which was operated by compressed air and weighed 14 tons. It had a double mold box and made six standard 8- by 8- by 16-inch blocks at one time. It worked out fairly well, but an excessively large quantity of air was required for the output obtained.

Being familiar with the successful use of vibration in the placement of concrete in poured structures, Mr. Gelbman reasoned that it ought to be possible to pack concrete blocks by vibration. Like others before him, he found it was not difficult to successfully pack the wetter mixes but these would slump when molded into the standard shapes of block. However, he persisted and evolved a machine in which the amplitude of vibration was limited or restricted. This did the trick and this machine was the basis for the Gelbman patents and was long used for further experimental work. In 1939 it was rebuilt and is now used for making "specials" in this plant.

Weigh-larry discharging cinders into one of the two 27-cubic foot mixers.

Plant of Concrete Units, Inc., with part of storage yard in foreground.

Another view of the plant with cinder-processing equipment at right, curing rooms at left.

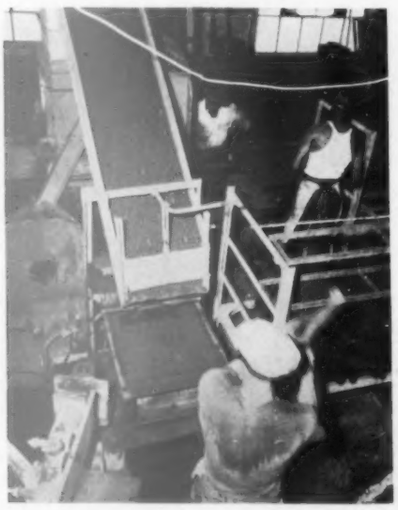
A few years later the plant was struck by lightning and in 1930 the company went out of the block business. Mr. Gelbman then started a machine shop and spent much of his time making improvements to his machine. A completely-automatic machine was the result and Mr. Gelbman attempted to sell units of this type to other producers. He soon found, however, that a high-capacity machine was hard to sell in the depths of a depression so he developed a smaller machine which made one standard block at a time. This had been on the market only a short time when in 1934 Gene Olsen, president of Stearns Manufacturing Company, Inc., was given exclusive sales and manufacturing rights under the Gelbman patents. Further development by both the Stearns company and Mr. Gelbman resulted in what are now known as the Stearns Number 7 and Number 9 Joltcrete machines.

In 1939 Mr. Gelbman decided to go back into block manufacturing and the present plant was built. It goes without saying that Stearns Joltcrete block

General interior view showing three production machines and racks.

machines incorporating the features he developed are used exclusively. The present equipment includes two Number 9 Joltcrete machines in addition to the older large and small machines already described. The original small Number 7 machine is also being used in this plant.

The greatest demand has been for cinder blocks which are used for back-up work, partitions, load-bearing walls, fire walls, etc. The sand-and-gravel blocks are used chiefly for load-bearing



The 7-year-old experimental machine. Six 2-inch slabs are being produced simultaneously on a plain pallet.

walls and there is a small demand for them for exterior work. Soft-coal cinders from a power-plant are used and they contain little sulphur or iron.

Both the cinders and the blocks made from them exceed all the requirements of the New York City Board of Standards and Appeals and both are approved by that body. This board is the final authority on such matters and under its supervision every size of block made by the company was tested for absorption, compressive strength, fire resistance, etc. The board also requires the use of water meters on mixers, clocks on the mixer floor, steam curing for a certain minimum length of time at prescribed temperatures and degrees of humidity. The blocks must also be yard-cured for at least 28 days. Every delivery ticket must have on it the board's approval number for this type of block and each block must have on it an identifying mark.

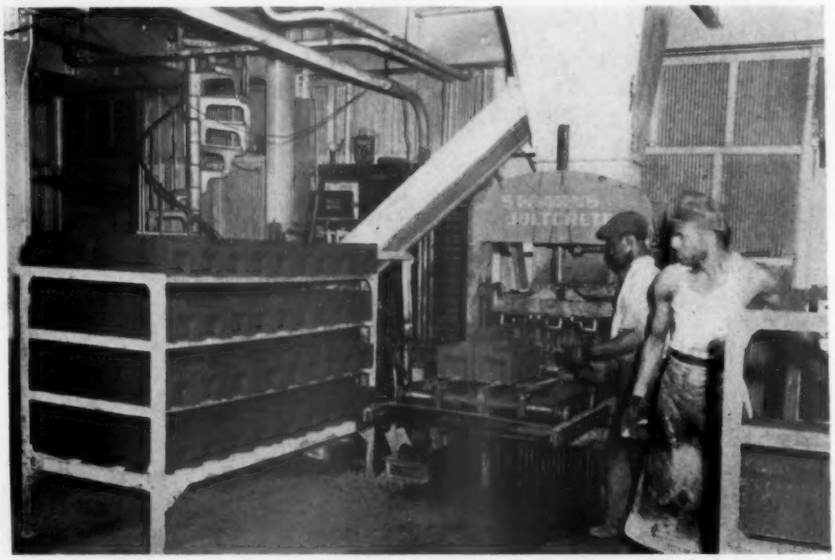
On the average 25 standard 8- by 8- by 16-inch cinder blocks are obtained from a sack of standard Portland cement and these blocks test well over the 700-pound minimum. The 2- by 8- by 18-inch blocks and the 3- and 4- by 8- by 24-inch partition blocks are usually made of cinder concrete. The 6-, 8-, and 12- by 8- by 16-inch blocks are made of either cinder or sand-and-gravel concrete and are either "solid" or "hollow" with 25 or 40 per cent. voids. All these are made on the Number 9 Joltcrete machines which together average 8,000 standard blocks daily. These machines are also used to make 6- and 18-inch header blocks in both the 7¾-inch height for standard bricks and the "jumbo" 9¾-inch size for "jumbo" bricks. All the header blocks are made with closed tops which are well liked by the trade because they provide a better mortar base. The 3- and 4-inch partition blocks are also made with closed tops. Lintels, jamb blocks, gutter blocks, and other specials are also made on these machines.

The small machine makes six 2-inch slabs at one time or one standard block,

Gasoline-powered lift-truck hauling a rack-load of units.

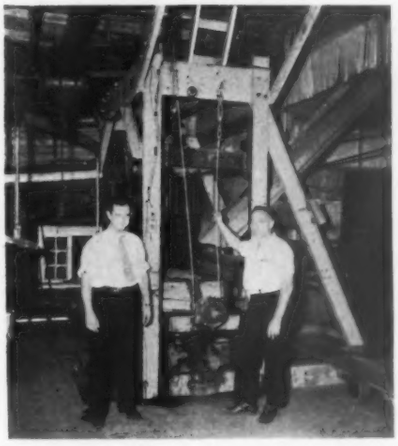
both on plain pallets. The old machine is used for making a variety of "specials." For one defense job 4¾- by 8- by 24-inch blocks were made 11 at a time on a plain pallet.

The aggregates are delivered in trucks and are discharged into a 40-cubic yard hopper. An apron-feeder is followed by a short belt-conveyor with a Dings magnetic head pulley which removes any iron that may be present. A bucket-elevator feeds the material to



One of the machines making 8- by 8- by 18-inch cinder units.

a 1-deck Jeffrey-Traylor electric vibrating screen which has ⅜-inch wire cloth. The oversize cinders drop into a Robins roll-crusher and both materials are carried on a short belt-conveyor to an inclosed Jeffrey bucket-elevator. When sand and gravel are being processed the crusher is by-passed. This elevator feeds a second Jeffrey-Traylor 1-deck screen which is equipped with ¼-inch



Martin Gelbman, office manager, Nathan Gelbman, superintendent, and one of the original models now used to make large-size specials.

wire cloth. The two products of this screen—⅜- to ¼-inch and minus-¼-inch—are discharged into separate bins.

The four 75-cubic yard bins were originally intended for sand, pea gravel, and two sizes of cinders, but three of them are now used for cinders. The cinders are now weighed out in the desired proportions into a Columbus Conveyor Company travelling weigh-larry which is equipped with a 2-beam scale and an over-and-under indicator. From this larry the batches are discharged into the two 28-cubic foot Stearns mixers (with gear-head motor drive direct to the paddle shaft) which are

Roll-crusher, elevator and screen which process cinders.

equipped with protective gratings. The cement is dumped into the mixers from sacks and the water is measured by a manually-controlled Buffalo water meter. Each mixer supplies concrete to one Number 9 Stearns Joltcrete machine and one has a chute to a Number 7 Joltcrete. A portable mixer driven by a Le Roi gasoline engine supplies the concrete for the old block machine.

The blocks from these machines are stacked on Chase steel racks holding 72 standard 8- by 8- by 16-inch blocks. A Clark gasoline lift truck hauls the racks into the four 11½- by 85-foot kilns, each one of which holds 36 racks. The blocks are cured in 170-degree live steam over night before being removed to out-door storage by the same lift truck. Usually at least 250,000 blocks of all sizes are kept on hand, but the demand has been so great recently that the stock has been much smaller. Most deliveries are made well within a 50-mile radius of the plant. One recent order was for 250,000 blocks for a housing project in Bridgeport, Connecticut, 50 miles distant.

News of the Industry

The Zenith Concrete & Coal Company has been formed at Houston by Fred G. Wood to deal in ready-mixed concrete and fuels.

Mr. Wood, formerly vice-president of the Zenith Dredge Company with headquarters in Duluth, Minnesota, acquired the business which was formerly operated as part of the dredging firm.

Operations at present are located at Wharton, Texas, where a Butler plant will batch 17,000 cubic yards of concrete for a highway-widening project.

The Central Pre-Mix Concrete Company of Spokane has added a Mixermobile portable concrete-mixing plant.

After 15 years as district engineer for the Portland Cement Association, H. J. Young of Lincoln, Nebraska, has joined George Olson in the Wahoo Concrete Products Company at Wahoo, Nebraska. Concrete units and ready-mixed concrete are being produced.

The Central Ready-Mixed Concrete Company of Milwaukee will supply the concrete used in building the new Lone Star Ordnance Plant near Texarkana, Texas.

Granite Products, Inc., has been formed at Miami, Florida to manufacture Granitile concrete floor slabs and other products. A. J. Dieffenderfer of Miami Beach heads the concern, his associate being A. H. Sexton.

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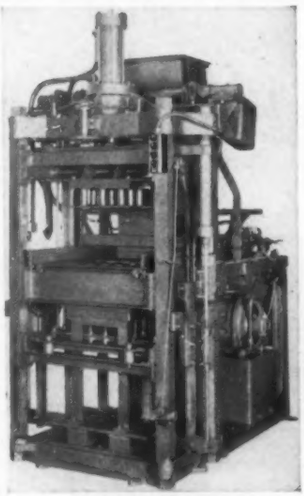

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Tower-Mixers Enable Ready-Mix Firm to Offer Complete Concrete Service

By H. F. THOMSON
Vice-President, General Material Co.

Figure 1.

Figure 2.

A COMMERCIAL ready-mixed-concrete manufacturer is constantly confronted with the problem of aiding his customers in arrangements for elevating concrete to second- and third-story levels. Although basically the province of the ready-mixed-concrete producer, as a supplier of a building material, ends with the delivery of the concrete at ground level, just as with suppliers of brick, steel, lumber, and other items, the fact remains that the concrete producer is definitely interested in the provisions for elevating as the timing and release of the concrete trucks are directly involved.

Prominent among the types of equipment which have been offered to meet this need for convenient and economical elevation of concrete is a style of tower-mixer known by the trade name of Mixermobile. This unit was developed in the northwest after several years of effort, and was introduced to the trade through the Middle West and East during the fall of 1940. It consists essentially of a 2-cubic yard, fixed-axis, building mixer, mounted on a light truck chassis, which also carries a skip for charging dry batches into the mixer, and a folding tower with a bucket for hoisting the concrete from the mixer to the desired level; the mixer, skip, and hoist-bucket are all drawn by the truck-engine through suitable clutches and chain-drives.

The General Material Company, pioneer ready-mixed-concrete manufacturer in St. Louis, is operating two of these tower-mixers as adjuncts of its established business in furnishing commercial concrete service in the St. Louis metropolitan area. During a year's experience this company has found that the great flexibility of this equipment has given it a much wider use in its service than the original conception of elevating only, as indicated by the following classes of applications in which it has been used:

1. Delivering concrete to second- and third-floor levels.
2. As a job-mixer where service with dry batches could be handled faster and far cheaper than with truck-mixers.
3. As an independent central-mixing plant, from which concrete is delivered in agitator trucks, either at an outlying

Figure 3.

Figure 4.

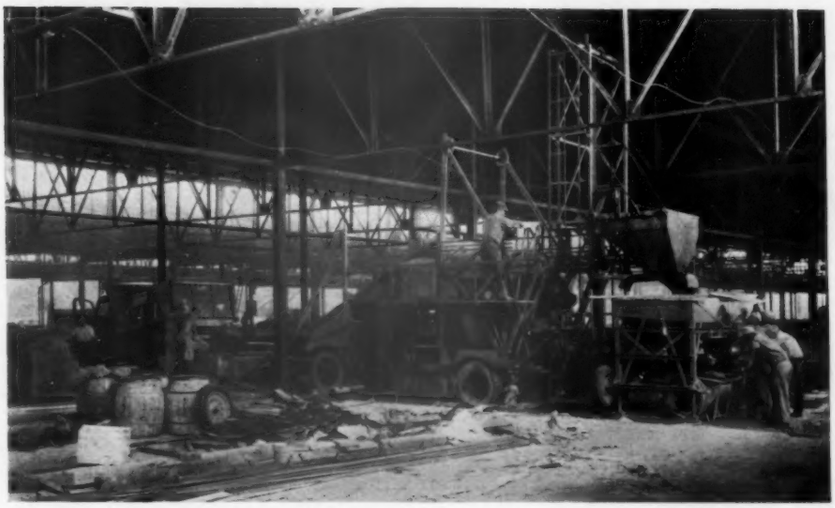


Figure 5.

Figure 6.

point or at a site near a major project, so that available agitator-truck units could deliver at their maximum rate due to the reduced length of haul.

The accompanying illustrations show the tower-mixer unit operated on various projects in the St. Louis area as indicating the variety of applications in which this company has used it successfully.

In delivering to the second floor of a large warehouse an interesting feature was that of locating the unit at three positions along the side of the building, thereby eliminating the cost of moving an ordinary power or the excessive expense of long buggying from a single position of the tower (Figure 1).

In delivering to the second and third floors of a manufacturing building a 55-foot tower (height of head-block) was used without guys and the concrete was handled by chute into a floor hopper (Figure 2).

When used as a central-mixer at an outlying industrial plant the concrete was delivered by agitator trucks to scattered foundations (Figure 3).

When used as a job-mixer a unique feature of the set-up was the ability to deliver concrete either into a floor hopper on the ground floor or *via* the tower into buggies on the second floor (Figure 4).

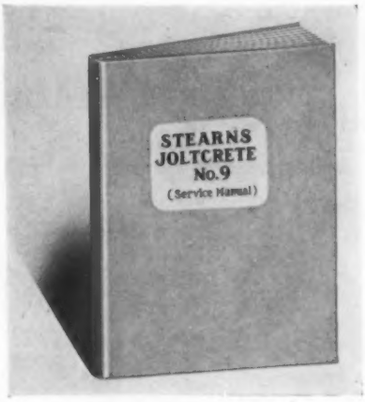
In an application as a job-mixer on a large floor job it was possible to deliver over a short tower into a Jaeger double-floor hopper (Figure 5), which accommodated two lines of buggies; the ability to move the mixer every third day and thereby minimize the length of the buggying was important.

In use as a central-mixing plant to serve a large defense project the haul from this set-up to the entrance gate to the project was only two city blocks (Figure 6). With the rate of deliveries exceeding 40 cubic yards per hour, the trucking of dry batches removed this traffic in materials from the single railroad connection in the vicinity of the project.

An oil-burner tank-type of water heater mounted on a trailer is available for furnishing an ample supply of hot water for winter operation (Figure 7).

In operations where concrete has been delivered to the contractor at elevations above the ground, it has been the invariable practice of this company to charge the contractor a unit price on the concrete higher than that applying to deliveries at grade, either by truck or from the tower-mixer, as this extra charge for elevating replaces the contractor's expense in providing his own hoisting. For operations in the metropolitan area the power-mixer has always been operated by the concrete company as an adjunct in connection with its ready-mixed-concrete service, and not on a rental basis.

Figure 7.



A book unique in the field of concrete machinery has just been issued by the Stearns Manufacturing Company, and distributed to operators of No. 9 Joltcrete block machines. It consists of 56 pages of detailed information, including 23 full-page drawings, on the installation and maintenance of these vibration machines, with instructions so detailed that any mechanic who can read a blue print can handle the entire installation job and thereafter service the equipment without difficulty.

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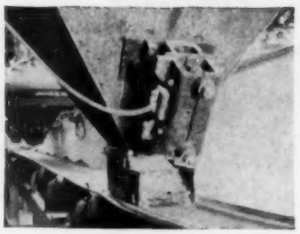

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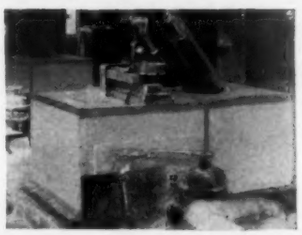

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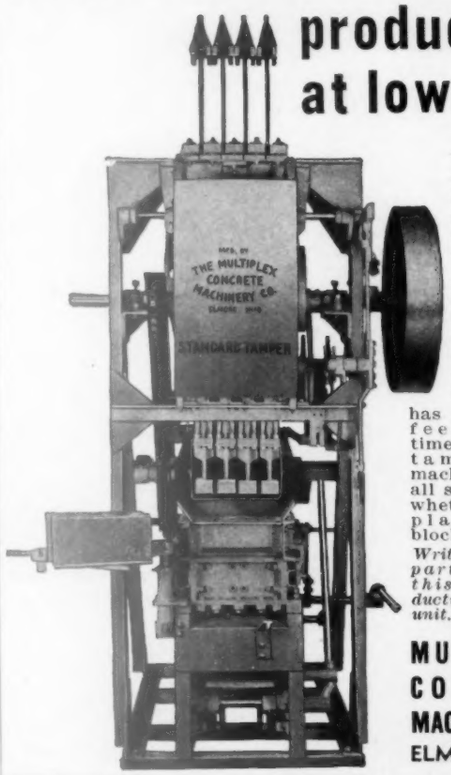

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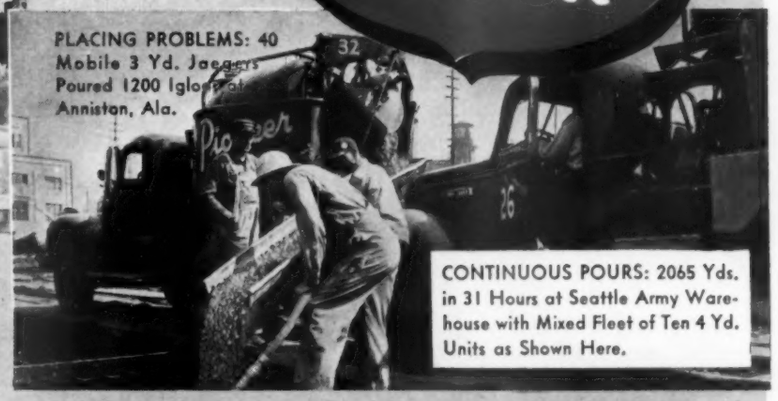

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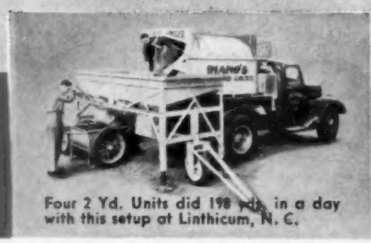

Four 2 Yd. Units did 198 yds. in a day with this setup at Linthicum, N. C.

THE JAEGER MACHINE CO.
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World's Largest Manufacturer of Concrete Mixing Equipment — Pumps, Hoists, Concrete and Bituminous Paving Equipment.

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Save money on your production costs by installing Chase Lift Truck Rack or Concrete Cars with Chase Patented Spring bearings —dust proof, oil retaining flexible boxings with roller bearings. Used and recommended in most of the concrete plants.

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Complete line of concrete block cars, decks, Lift Truck Racks, transfer cars, turntables, dump cars, etc.

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"It's really a BRICK!"
THE "J & C" PRESS
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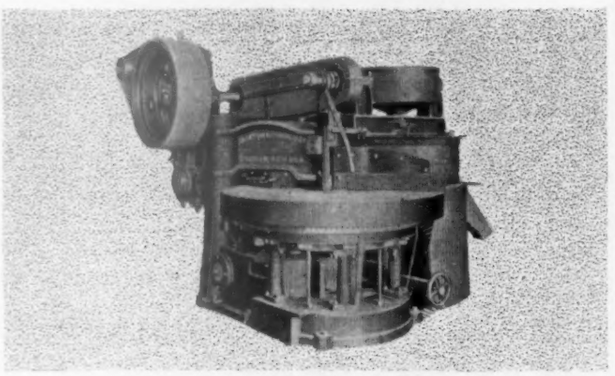

Users say that they can make high quality concrete brick *faster* and *cheaper* on a "J & C" automatic machine.

All brick are accurately sized—have clean, uniform edges—are smooth textured, and high in strength.

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The "Quinn Standard"
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Hand or wet process. Built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell end pipe—any length.

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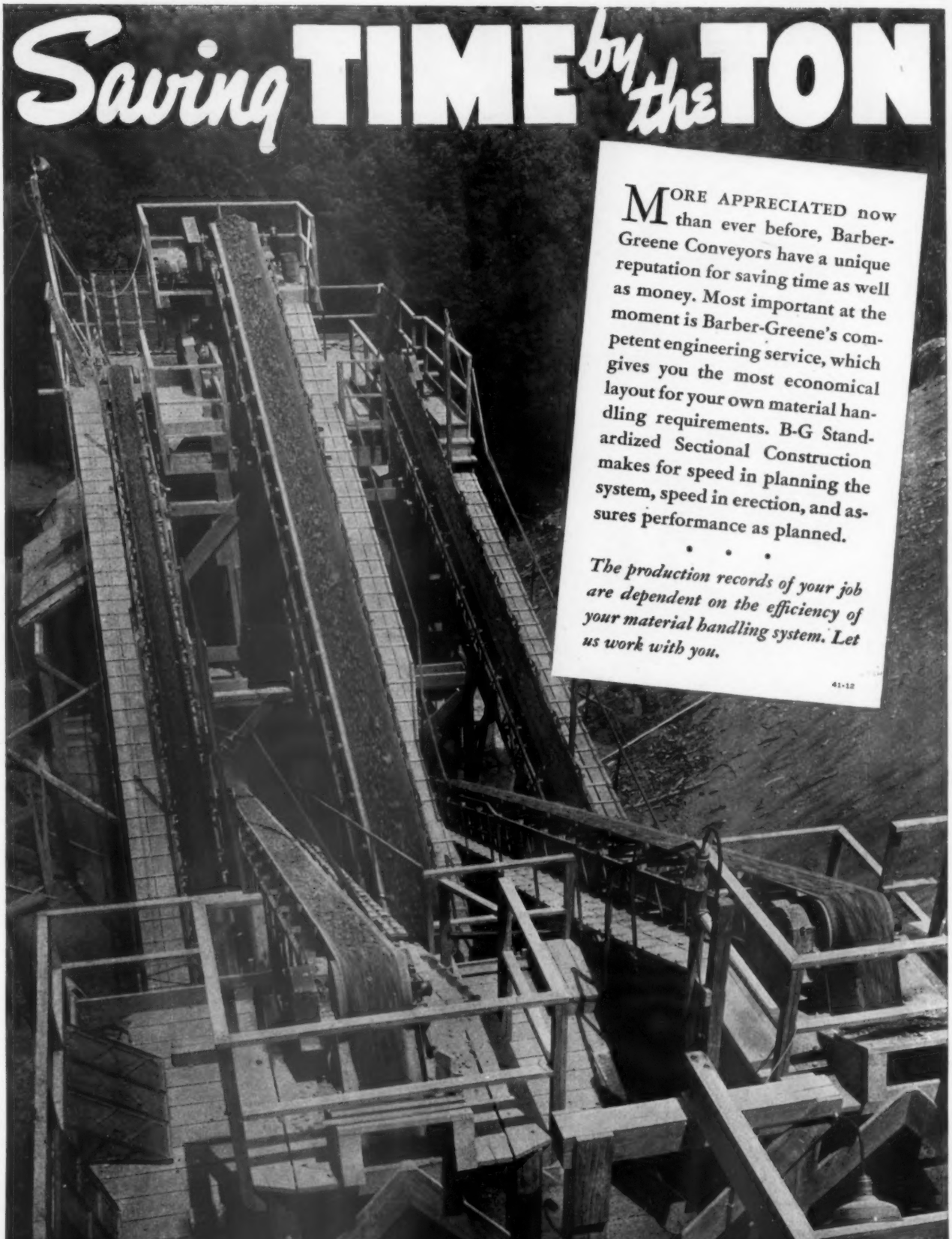
Saving TIME by the TON



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1-2-3 and now 4

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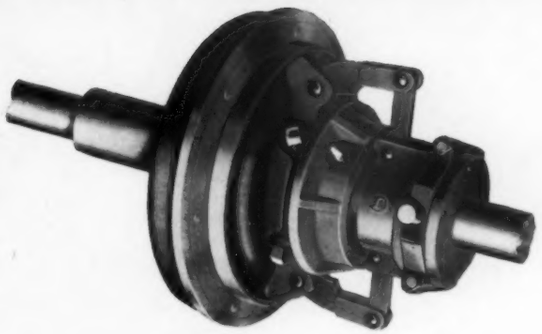

JONES-LEMLEY friction clutches are built for a broad range of shaft sizes and ratings in both enclosed and open types for sleeve and coupling work. In addition they are available in a line of Jones-Lemley friction clutch pulleys. This clutch modification is also used for gears, V-belt sheaves, sprocket wheels, etc. Sizes, ratings, dimensions, prices and other data are contained in Bulletin No. 60. Your request will bring a copy.

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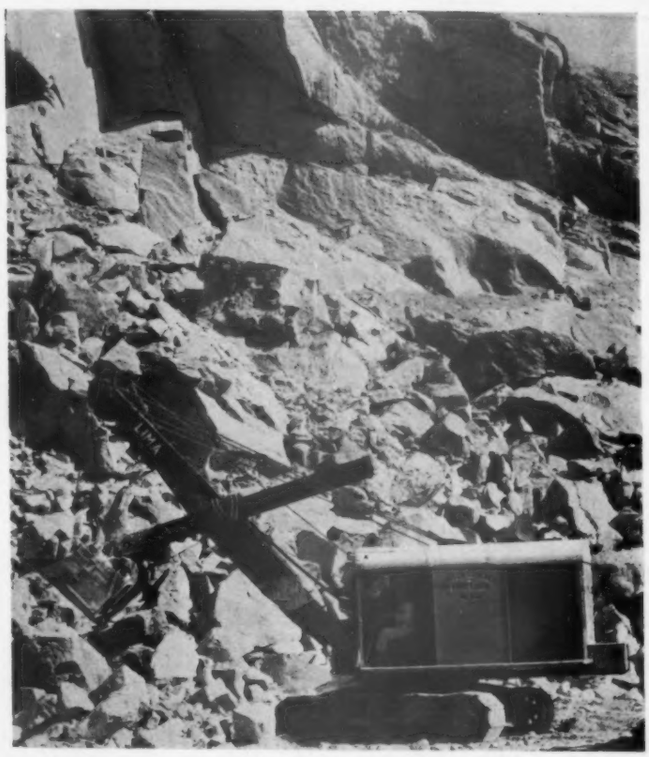
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES



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LIMA shovels, draglines and cranes serving the rock products industry are providing the long, dependable and efficient service so desirable in well operated and successful quarries. The features that make LIMA excavators so satisfactory and profitable include . . . helical cut gears for quiet, smooth operation . . . large diameter drums for longest possible cable life . . . independent clutches which make it possible to hoist, swing, travel and boom up or down simultaneously . . . fast, mobile crawlers which make difficult traveling easy. These features and many more mean fewer delays, steadier production and greater dollar value. Make your next shovel, dragline or crane a LIMA.

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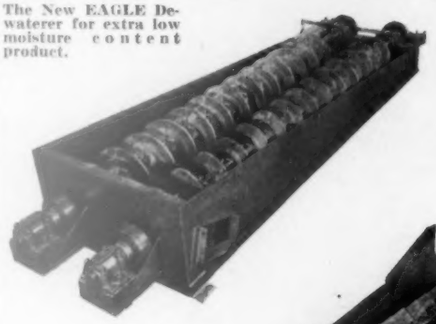

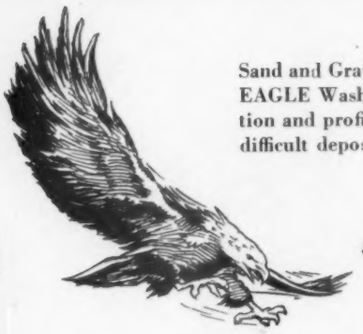

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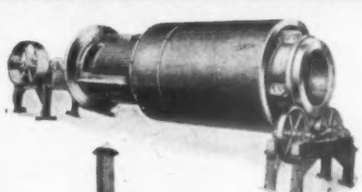

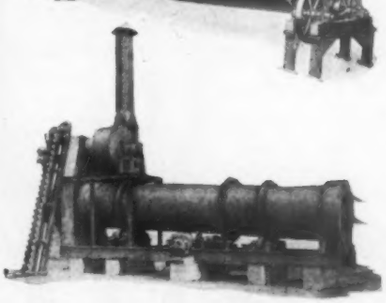

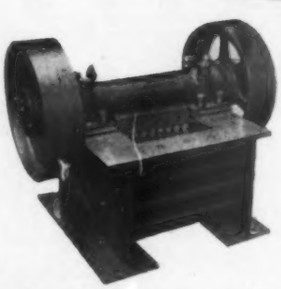

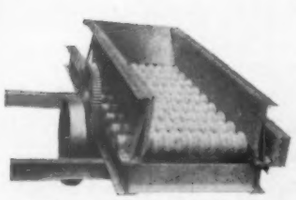

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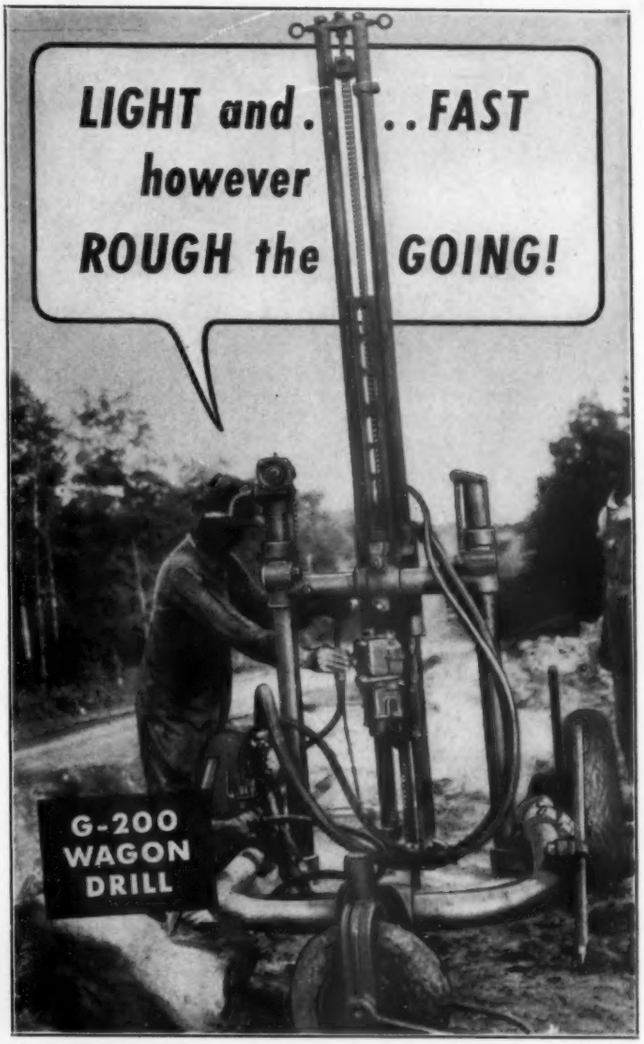

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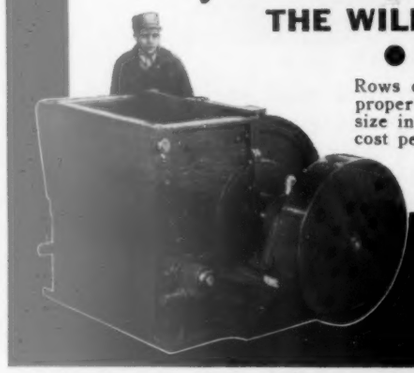

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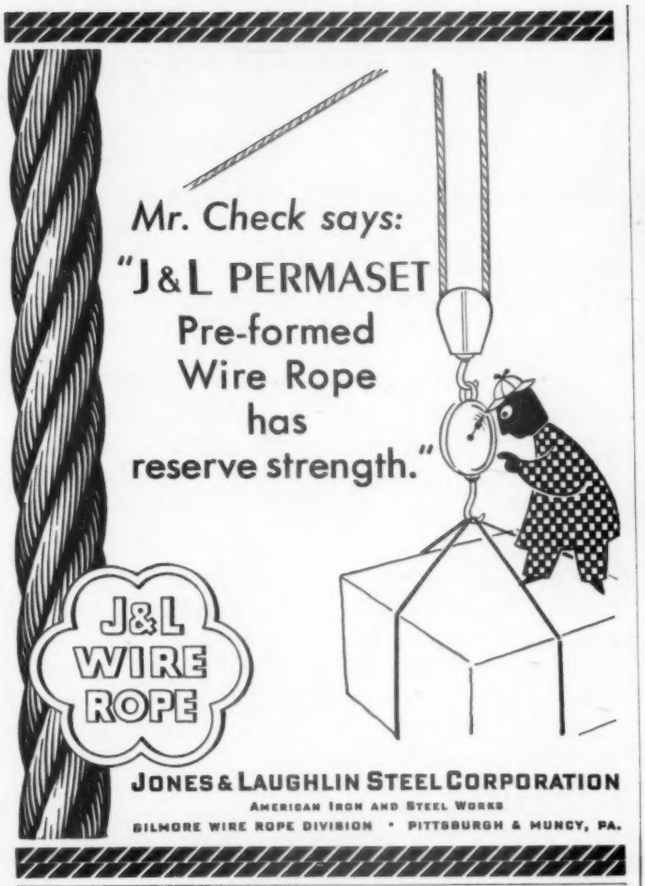

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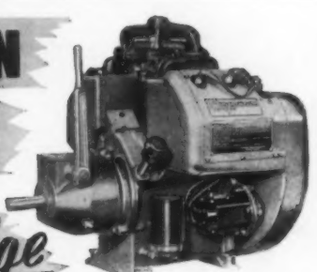

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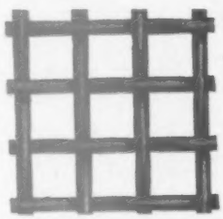

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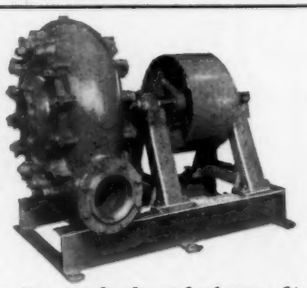

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for maximum productiveness from your vibrating screens.
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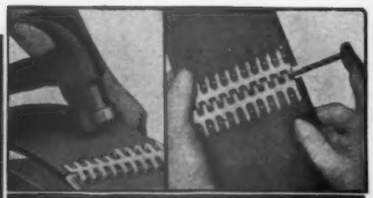
HENDRICK MANUFACTURING CO.
39 Dundaff Street, Carbondale, Pa.
Sales Offices in Principal Cities. Please Consult Telephone Directory

BELT LACING and FASTENERS for transmission and conveyor belts



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ALLIGATOR

Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

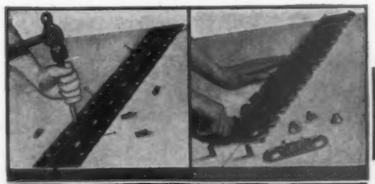
FLEXCO HD

BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application. 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere

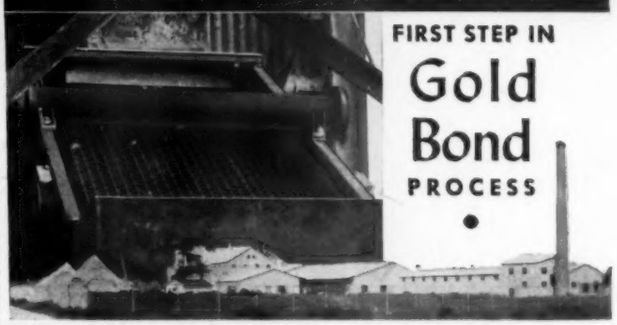


"CONVEYOR BELTS EASILY FASTENED"

FLEXIBLE STEEL LACING CO.

4623 Lexington St.
Chicago, Ill.

LOW COST SCREENING OF GYPSUM ROCK



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● The Savannah, Georgia, plant of the National Gypsum Co. converts 500 tons of gypsum rock into "GOLD BOND" Special plaster and plaster board every 24 hours. After the first crushing, most of this material is screened by a Link-Belt 2-deck vibrating screen. For 2½ years, a veritable torrent of crushed rock has poured through this screen, which has given continuous trouble-free operation at rock-bottom cost. As in numerous similar installations, the rugged, simple design of the Link-Belt vibrating screen has proved the answer to economical production.

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Read full details of features of Link-Belt Vibrating Screens that assure smooth, low cost performance. Ask for Bulletin No. 1762.

LINK-BELT COMPANY 8808
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WRITE TODAY! **LINK-BELT Vibrating Screens**

DEPENDABILITY —VITAL TO VICTORY

STEAM—GASOLINE—DIESEL LOCOMOTIVES—ELECTRIC OR MECHANICAL DRIVE

STEAM—GASOLINE—DIESEL LOCOMOTIVES—ELECTRIC OR MECHANICAL DRIVE

DAVENPORT LOCOMOTIVES — Builders of the World

Davenport Locomotives are assuming heavy responsibilities at many key centers of war activity. They will perform efficiently and dependably—moving VITAL WAR MATERIAL and conserving VITAL WAR TIME. The 30 ton Diesel-Mechanical power unit in service at Pearl Harbor typifies the many locomotives we are supplying to the Army, the Navy, our Allies, American war industries, and American war contractors. To the many users, who KNOW, from intimate, first hand experience, the outstanding qualities of modern Davenports, we offer all cooperation within our power toward keeping these valuable power units in good condition.

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A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA

USERS TELL SUCCESS STORY OF . . .

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"OUR welders are pleased with Bergstrom Ranalloy because in running the rods no scale is formed and it is not necessary to brush or chip before applying additional beads, which saves considerable time in labor."

"The free flowing rod has proved very successful for repairs on heavy machinery where tough and difficult conditions are encountered."

"It has been our practice to build up chain each year, but with Bergstrom Ranalloy we figure to get two seasons or more without rebuilding."

These comments are typical of many received from enthusiastic users. Have you tried Bergstrom Electrodes? If not, call Scully for them now. Available in six types—to suit practically every requirement for abrasion and corrosion resistance.

For STEEL, STEEL PRODUCTS, TOOLS, EQUIPMENT, MACHINERY *"Call Scully"*

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UNITED STATES STEEL

AT A BARGAIN PRICE!

HAMMER MILL TYPE CRUSHER

50 Tons Per Hour Capacity

12 x 12 x 10

Complete with 100 H.P. G.E. Supersynchronous Motor and all controls (3/60/2300). Practically new.

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Bath, Pa.

Also Fruehauf Trailer Model A478—7½ tons. Airbrakes on one axle—used for less than 500 miles. No reasonable offer refused.

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For Defense Project!

No Recapture!

—Will Buy or Rent—

4-6—SHOVELS, 1 yd. up. Diesels Preferred.

8-10—BULLDOZERS, 50 H.P. up. Caterpillars Preferred; but will consider any good make.

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4—EUCLID (or equal) TRAILER WAGONS, Bottom Dump.

2—LOCOMOTIVE CRANES.

6—TRUCK CRANES.

4—ROAD GRADERS.

2—PATROLS.

Must be in first-class working condition available within 2 weeks or sooner. Also interested in any other heavy excavating and transport equipment; especially interested in ½ yd. and up Clam Shell digging and rehandling and Dragline Buckets. Wire or phone.

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BAY CITY Model "S" combination 1 yd. shovel, crane & dragline.
UNIVERSAL-LORAIN Mod. 35—½ yd. comb. shovel, crane, dragline.
P & H Model 450—1 yd. Shovel.
KOEHRING #1—¾ yd. crane & dragline. Can furnish ¾ yd. Shovel Front.
HEYWARD—1⅛ yd. clam shell bucket.
WILLIAMS—½ yd. clam shell bucket.
INDUSTRIAL WORKS—25 Ton—8 wheel steam Loco. crane—50 ft. boom.
WHITCOMB Model CS-4—4½ Ton 24" Gauge Gasoline Locomotive.
3—PLYMOUTH Model FL-4 ton 24" Gauge Gasoline Locomotives.
DAVENPORT 22 Ton—4 Wheel saddle tank Type—Std. Ga. Loco. Cyl.—11"x16".
VULCAN—33 ton—4 wheel saddle Tank Type—Std. Ga. Loco. Cyl.—13"x18".
CH&E #11—Triplex Road Pump.
NOVO—40 H.P. Gasoline D.D. Hoist.
CARRY-ALL TRAILERS—10 to 30 Ton.
10—BUDA Model 119 and Model 19-L motor section cars for standard gauge track, Buda air cooled gasoline motor.

Other Type of Equipment, Too

SOUTHERN IRON & EQUIPMENT COMPANY

Plant and General Offices:
ATLANTA, GEORGIA

Gates #12-K, #8-K and #5 gyratory crushers.
Bucyrus 50B steam shovel, 1¾ yd., live boom, 27', on cats, rebuilt, A-1.
Monighan 3TW Walker draglines, diesel and electric, 70' and 100' booms.
Milwaukee 12 and 10-ton gas locomotives, std. ga., MCB; also 10, 8 and 7 ton.
Lima 2-yd. #801 shovel, semi-diesel.
Bucyrus-Erie #1035 and Northwest #105 gas comb. 1-yd. crane-shovels.
McMyler and O&S steam 22-ton locomotive cranes, 55' and 75' booms, MCB.
Brownhoist electric portal gantry crane, 18' ga., 55' boom, 3-yd. bucket.
Davenport 18 ton 36" ga. steam S/T locomotives.
Barber-Greene #42 bucket loaders, disc.
Link-Belt 1-yd. gas crane, 40' boom, on cats.
Butler 50-yd. steel jackleg bins (2).

H. Y. SMITH CO.
828 N. Broadway Milwaukee, Wis.

12" Steel Dredge Outfit with 300 HP motor.
1 yd. Cableway-Thomas Hoist—55 HP motor.
Gyratory Crushers: 12x46" & 36" TY Traylor.
10" Newhouse, 6, 9, 10K & 18N 36" Allis-Chalmers, Motor Driven.
Jaw: 10x30", 12x26" roller bearing Champion.
10x42" Acme, 15x36" Universal & Diamond.
24x36" Farrell & 42x48" Traylor.
Double Roll: 18x20" McLanahan, 30x30" & 42x16" Traylor.
Symons Cone: 2' coarse & fine bowls. 3' & 4' coarse bowls.
Barber Greene & Haiss Bucket Loaders
21—1½ yard 36" Gauge Atlas V Shape Dump Cars, Excellent Condition.
Two-40 ton Amer. std. ga. S.T. Locomotives.
One-70 ton std. ga. Lima Shay Rebuilt.
One-100 ton Amer. std. ga. Switcher.
Diesel Engines: 90 & 100 HP Fairbanks.
130 HP Caterpillar, 132 HP Waukesha.
175 HP Waukesha Gaso. & Natl. Gas.
5x5" Weinman Acid-resisting Cent. Pump.

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CRUSHERS—ELEVATORS—SCREENS
SAND WASHERS — PUMPS — CONVEYORS

1—4"x12" WHEELING No. 2 Jaw Crusher.
1—NEW and 1—Sec. Hd. 9"x15" Jaw Crusher.
1—9"x16" CLIMAX No. 2 Jaw Crusher.
2—#1030 CHAMPION Roller Bearing Jaw Crushers.
2—12"x26" CHAMPION No. 6 Jaw Crushers.
1—4½" TRAYLOR T Fine Gyratory Crusher.
1—#5 AUSTIN Gyratory Crusher.
1—Set STURTEVANT Balanced Crushing Rolls 21"x10½".
2—M-20 QUAKER CITY Hammer Mills.
1—#1 STURTEVANT Open Door Rotary Fine Crusher.
1—24" wide LINK-BELT Apron feeder.

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1—10' Gayco Separator—$1000.00 f.o.b. York, Pa. Good as new.
1—18" Schaffer Poidometer with water feed connections complete ready to go in first class condition, $500.00 f.o.b. cars York, Pa.
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LIME & HYDRATE PLANTS CO.
York, Pa.

Jaw Crushers—4"x8" up to 66"x84".
Crushing Rolls—16"x10" up to 54"x24".
Gyratory Crushers—No. 3 up to Mammoth.
Ring Roll Mills—No. 0, No. 1, No. 1½ and No. 2.
Swing Hammer Mills.
Rotary Fine Crushers—No. 0, No. 1, No. 1½ and No. 2.
Direct Heat Rotary Dryers—3½'x25', 4'x30', 5'x30', 5½'x40', 6'x50', 7'x50' and 8'x50'.
Semi-Indirect heat Dryers — 5'x30' and 8½x75'.
Cement Kilns—3' up to 8' diameter.
Hardinge, Marcy & Fuller-Lehigh Mills.
Raymond Mills—No. 00, No. 0, No. 1, No. 2 Roll.
2—6'x12' and 1—4'x10' rod mills.
Tube—Rod and Ball Mills—3' to 6' diameter.
Vibrating Screens—Air Separators.
1—4'x4' and 8'x6' ball mills.
New Dryers built for all purposes.

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Smith 56-S Tilting Type Concrete Mixer, 2 cubic yard capacity, excellent condition.

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Williams type P.C. material handling 1½ cubic yard capacity clamshell bucket, excellent condition.

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Loco. Cranes—25 ton Electric; 18 & 20 ton steam.
Shovel, Crane, Dragline, 1¼ yd., 45' boom.
Gas Shovel & Crane, ¾ yd.; ⅝ yd. Diesel shovel.
NW No. 2 Shovel; No. 105 & No. 3 Cranes-Drags.; Hoe fronts.
Shovel Fronts—¾ to 1½ yd., P&H-NW-Link-Belt.
30 Cat. Bulldozer; B-G Trenchers 6"x4' & larger.
Fairleads—For Link-Belt K-44 or K-45 dragline.
Buckets—Page ⅝ yd. M. 1 yd. RC. Msc. clamshells.
Light Plants—1500 to 5000 watts; Car Pullers.
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5-Type A TUBULAR Lakewood TOWERS
Double & Triple Drum Hoisting Engines

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915 N. Delaware Ave. PHILADELPHIA, PA.

For Immediate Liquidation & Removal
Highly Desirable Equipment of Interest to You

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Location: Nearby South

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2—Bonnet Direct Heat Dryers, 6'x60'.
1—Rotary Dryer, 5'x42'.
11—Dryers, 4'x30' (Rotary).
1—Rotary Dryer, 3'x22', with bucket elevator to load and steel housing for heating chamber.
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1—Bricked-in Boiler, 150 HP.
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1—Corrugated Steel Building, 100x50.
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1—Copper Triple Effect Copper Tubes, 2700 Sq. Ft. ea. effect.
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1—67 ton Porter 6-wheel Saddle Tank, A.S.M.E. Boiler, Overhauled.
2—38 ton Vulcan 4-wheel Saddle Tanks, A.S.M.E. Boilers, Overhauled.
1—32 ton Porter 4-wheel Saddle Tank, Overhauled.

2—79 ton American 0-6-0 Separate Tender Switchers, Completely Overhauled, I. C. C. Condition, Built 1923.

1—17½ ton Brownhoist Locomotive Crane, Overhauled, New A.S.M.E. Boiler.

Crane or Dragline Fronts for Marion 37 and Bucyrus 50-B, One Each.

1—1½ Yd. Rehandling Clamshell Bucket, Practically New.

Birmingham Rail & Locomotive Co.
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RECONDITIONED Steel & Cast PULLEYS

2 carloads in stock

E. Cohn & Sons
Cedar Rapids, Iowa

FOR SALE

1—19-Ton 0-4-0 Davenport Saddle Tank Loco., S. G. Good condition.
1—25-Ton 0-4-0 Davenport Loco., S. G. Immediate Delivery.
1—25-Ton Baldwin Gasoline Loco. First-class condition.
1—38-Ton 0-4-0 American Loco., S. G. Saddle Tank.
1—42-Ton 0-4-0 Baldwin Loco., S. G. Saddle Tank.
1—48-Ton 0-6-0 Baldwin Fireless Loco. Built 1922. Good condition.
2—60-Ton 0-6-0 S/T Switching Locos. Coal-burners. Excellent condition.

SEND US YOUR INQUIRIES FOR ANY KIND OF LOCOMOTIVES
37 years' experience

IRON & STEEL PRODUCTS, Inc.
13490 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON and STEEL"

DIAMOND NEW AND USED EQUIPMENT BARGAINS FOR IMMEDIATE SHIPMENT

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One (1) DIAMOND No. 301 Screening Plant, full anti friction, mtd. on pneumatic tires complete with Allis Chalmers motor. Serial No. 40-8-1-3.....Used
Two (2) Quarry plants for 10x20 anti-friction brg. jaw crushers** and folding type bucket elevators 25' lg. mounted on trucks with four steel wheels, 12x6x7¾" buckets..New

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Two (2) 10x36 Jaw crushers complete....New
One (1) 20x36 Jaw Crusher complete....New
One (1) 10x20 Pitman assembly, Timken bearing.....Rebuilt
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One (1) 10x24 jaw crusher (new Pitman) Base is welded.....Used
One (1) Hopper for 15x36 crusher.....New

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One (1) 22x14 roll crusher complete (1st class) with flywheels.....Rebuilt
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One (1) Bucket elevator 32'0" centers, rigid type, with buckets 12x6x 7¾" less belt.....New
One (1) 20'0" bucket elevator with buckets 10x6x7¾" mtd. on chain.Rebuilt
One (1) Bucket elevator complete with shafts, bearing, buckets, bucket chain sprockets, and drive chain —less frame.....New

SCREENS

Slightly
One (1) 30"x10'0" dbl. shaker screen....Used
One (1) 4'x10' three deck vibrator (1st class) screen.....Rebuilt
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One (1) 18"x20' Diamond light duty portable loading flight conveyor complete with steel wheels and motor.New
One (1) 18"x30' Diamond light duty portable loading conveyor complete with steel wheels and motor....New
One (1) Grizzly sand rejector.....New
One (1) 30' conveyor with 20" belt built for swivel connection.....New

FEEDERS

One (1) 30"x5'0" Apron feeder. Does not include hopper, drive or support.New
One (1) Grizzly and plate feeder.....New

MISCELLANEOUS

One (1) Set of Bin Gates—12"x12".....New

STEEL WHEELS

Six (6) Steel wheels 40"x10" F. to take 4" Hyatt brgs.....New
Four (4) Steel wheels 44" dia. x 16" F. to take 4" Hyatt brgs.....New
Four (4) Steel wheels 28" dia. x 4" F. 1¾" bore.....New
Ten (10) Steel wheels 28" dia. x 5" F. 1 15/16" bore.....New
Eight (8) Steel wheels 24" dial x 3½" F. 1⅝" bore.....New
Four (4) Steel wheels 28" dia. x 14" F. Bore 4" Hyatt.....New

**The above Quarry plants do not include crusher. The above Pitman assemblies can be installed in new bases and the complete machine sold.

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MINNEAPOLIS MINNESOTA

12 Ton Whitcomb Locos.—Gas, 36" Ga.
8 Ton Plymouth Locos.—Gas, Std. & 36" Ga.
14 Ton Vulcan Locos.—36" Ga. Steam.
1¼ Yd. Northwest Shovel attachment.
1¼ Yd. Bucyrus Erie 41B Shovel attachment.
Barber-Greene 42 Bucket Loader.
Erie B-2 Steam Crane, ¾ Yd.
40 Ft. Crane Boom, Erie.
15-Ton Steel Guy Derricks, 100' boom.
Electric Hoists—50, 60, 100 HP.
3 Inch Centrifugal Pump, 75 ft. head, 40 HP. elec. motor.
15 cubic yard steel bin.

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USED SPEED REDUCERS

All Types—Sizes up to 300 H.P.

Falk—Link Belt—James—Cleveland, Etc.

CONVEYING EQUIPMENT
Save 60% of New Net Costs

All Materials, Overhauled, Guaranteed

Immediate Delivery

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ROCK CRUSHERS portable and stationary. 5 to 200 Tons per hour capacity.
REPAIR PARTS for all Acme Road Machinery Company products.
ACME ROCK MACHINERY CORPORATION
Frankfort, New York, U. S. A.

D. Heyward Hamilton, Jr., Attorney
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To the highest bidder without limit or reserve

MACHINERY, PLANT EQUIPMENT, TOOLS, ETC., OF BEAVER DAM MARBLE CO.

ALSO VALUABLE IMPROVED FEE-SIMPLE LAND

22 Acres, More or Less

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Sale on the Premises
OREGON-TEXAS ROAD
COCKEYSVILLE, MARYLAND
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A descriptive circular of the machinery, plant equipment, land and buildings, will be mailed upon request to auctioneer.

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Beaver Dam Marble Co., Inc.

A. J. BILLIG AND CO.
Auctioneers
Calvert 1066
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Byers combination shovel-dragline, 40 ft. boom, ⅝ cu. yd. Good working condition. $3,000.00.
Bucyrus-Monighan 3W, Dragline, 110 ft. boom, 2 yd. 15x36 Universal Jaw Crusher. $1,250.00.
21-yd. Portable Steel Bin, jacklegs. $375.00.
Caterpillar Diesel D.7 with Bulldozer. A-1. $3,000.00.
Caterpillar No. 22. Gasoline. Good. $450.00.

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Locos. (2) Baldwin & Amer. 6 wh. 75 ton switchers.
Cars (4) 50-ton flats fishbelly 40 ft.
Shovels Marion 37E1. Bucy. 100B el. Bucy. 50B steam.
Draglines Bucy. Monig. (3) 6W-8160 all diesel.
Loco. Cranes McM 20 ton—Brown 20 ton—Orton 22 ton.
Crushers 18N, 10K, 9K, 9McC, 8K.
Crushers Jaw & Cone 42x48—4 ft.—(2) 3 ft.
Conveyor 454 ft. centers 48" belt with motor.
Clam buckets Bl. Knox 2 & 3 Yd.—Orange peel 2 yd.

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Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully guaranteed.. Write for List and Prices.

V. M. NUSSBAUM & CO.
FORT WAYNE, IND.

1—CLIMAX MOTOR, Model R6U, 6x7 cylinders, 150 Horsepower.
1—Waukesha Motor, Model WL 340, 6¼x8 cylinders, 125 Horsepower.
Both units equipped with TWIN DISC CLUTCHES, and mounted on skids.

Ready to Go and Priced Right
INDIAN POINT STONE QUARRY
R. R. No. 2 — Athens, Ill.

FOR SALE

Motor Truck Scales.....$297.50 up
Vibrating Screens .....$395.00 up
Portable Platform Scales.....$ 21.50 up

Bargains in all types of scales and vibrating screens.

BONDED SCALE COMPANY
Manufacturers
Dept. PQ — Columbus, Ohio

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All sections new and relaying rail, spikes, bolts, frogs, switches, "V" Shaped, flat and Contractors' Cars, etc. Prices cheerfully quoted.

M. K. FRANK
480 Lexington Ave., NEW YORK CITY
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FOR SALE

18" x 36" Stevenson Single Roll Crusher.
9" x 36" Wheeling Jaw Crusher.
9" x 15" Phillips Jaw Crusher.
#4 Champion Jaw Crusher.
#1 Williams Hammermill Crusher.

PITTSBURGH MACHINERY & EQUIPMENT CO.
Aspinwall — Pennsylvania

RAILS and ACCESSORIES

RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.
NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.
Most sizes usually available from warehouse stocks. Every effort made to take care of emergency requirements. Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH — NEW YORK — CHICAGO

FOR SALE

IMMEDIATE DELIVERY

2—Kent Ring Roll Mills, #3, perfect condition.
3—General Electric 30 KW, Gasoline Eng., Generators 115 Volts, D.C.
Electric Motors, 10-HP, to 125 HP. Slow speed, 3 phase, 60 cycles, 440 volts.

BURTON MACHINE CO., INC.
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FOR SALE

One 10-S Jaeger Mixer Non-Tilt type, Four Cylinder LeRoi Motor. Like New.

CROSSWICKS SAND & GRAVEL CO.
Crosswicks, New Jersey

NEED DUMP CARS?

Immediate Delivery:
16, 24-yd. Koppel
9, 30-yd. Koppel
3, 20-yd. Western
24, 16-yd. Western
11, 16-yd. Kilbourne & Jacobs
62, 12-yd. Western
Illustrated specifications available—Other Types of Cars Too. Also Locomotives, Cranes, Shovels, Etc.

IRON & STEEL PRODUCTS, Inc.
13490 S. Brainard Ave. — Chicago, Illinois
"ANYTHING containing IRON or STEEL"

FOR SALE

Located Denver, Colorado

2—9-24 Bronze Bearing Universal Jaw Crushers .....$1,200.00 each
1—13B Farrel Bacon Jaw Crusher 24x 13B Blake 1,000.00
1—# 3 Telsmith Breaker Serial 571.. 600.00
1—# 2F Telsmith Reduction Crusher Serial 1032 ..... 800.00
1—Set of extra concaves and mantles with the Telsmith Crushers.

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FOR IMMEDIATE SALE

Bucyrus-Erie, ½ cubic yard, gasoline power shovel. Model 1020. Serial No. 11546. Price $2500 cash, f.o.b. quarry.

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R. R. No. 3, Baden Station, St. Louis, Mo.
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LOCOMOTIVES

ALL STANDARD GAUGE EQUIPMENT

SADDLE TANK TYPE

One—4-Wheel Steam Saddle Tank.....30 tons
One— " " " " —ASME Boiler.....39 tons
One— " " " " .....50 tons

SWITCHERS

One—4-Wheel Standard with Tender.....40 tons
One—6-Wheel " " " .....52 tons
One— " " " " .....68 tons
Two— " " " " .....71 tons

ROAD

Two—6-Wheel MOGUL 2-6-0.....52 to 63 tons
Two—8-Wheel CONSOLIDATED.....82 tons & 92 tons

ALSO ATLANTIC & SANTA FE TYPE ENGINES

ALSO: HOPPER, GONDOLA, FLAT AND BOX CARS
STEAM AND CRAWLER TYPE GASOLINE CRANES

RAILWAY ACCESSORIES COMPANY
Carew Tower — Cincinnati, Ohio

REBUILT TRUCK MIXERS

For Rent or Sale
All Sizes
With or Without Trucks

7—2 yd. Separate Engine Drive Truck Mixers, Mounted on Fords and Chevrolet—Good Running Condition, Now Working, Immediate Delivery. PRICE EACH.....$1500

27-E MULTI-FOOTE PAVER
Road Forms—Finishers

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Used Metal Working Machinery, Pipe
Structural Steel
Steel Plates and Sheets
Rails, Locomotives, Cars
Contractors Equipment
Storage Tanks

Also Will Buy Any of Above.

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122 S. Michigan Av. — Chicago, Ill.

FOR SALE

SAND & GRAVEL floating plant complete with screens, crushers, etc. Capacity 250 cu. yds. per hour. Mounted on wood barge 127' length x 44' breadth x 10'8" depth.

METROPOLITAN SAND & GRAVEL CORP.
551 5th Avenue — New York, N. Y.

Available Now—To Help You Speed Up

JUST PURCHASED

1—22x50 "Champion" Jaw Crusher.
1—#1020 Good Roads Reduction Jaw Crusher.
1—Kennedy "25" Ball Bearing Gearless Crusher, for fine crushing.
2—Allis-Chalmers Centrifugal Vibrating Screens, 4'x8'.
1—3 compartment Butler Bin with 3-beam 2 yd. Weighing Batch Hopper.
10—16" LINK BELT CONVEYORS, ANTI-FRICTION TROUGHING IDLERS, VARIOUS LENGTHS, STEEL FRAME, APPROX. 1000 ft. USED IN OIL REFINERY.
1—Belt Conveyor 24" x 153'.
1—Belt Conveyor 30" x 146'.
1—Belt Conveyor 20" x 52'.
1—Belt Conveyor 24" x 170.
1—Belt Conveyor 20" x 28'. 3/60/220 volt Electric Motors for driving above.

1—142 H.P. Buda Diesel Industrial Power Unit.

ROTARY DRYERS

Direct Heat: 5'x30', 6x40, 6x50, 6x60, 7xC0 single shell.

VIBRATING SCREENS

2 Sets of Type 39 double deck 4x.' Tyler Hummers; 4x5' 2-deck; 4x7' Leahy 2-deck, motor driven; 3x10' Kennedy, 3-deck; 3x5' Kennedy, single deck.

LIME HYDRATORS

Weber Sr. Type, made by Arnold & Weigel with No. 1 Raymond Bros. Lime Separator; also Krizer.
One Complete Hydrated Lime Plant.

GYRATORY CRUSHERS

1—15" Telsmith, #7½.
1—20" Superior McCully.
1—27" Gates, with 100 H.P. A.C. motor.
1—No. 410-TZ Traylor, 10" feed, can be set to ½".
3—Kennedy No. 19, No. 25, No. 49.
2—Telsmith No. 2-H and No. 3-F.
1—No. 40 Telsmith, 5" feed, ⅞ discharge; also No. 40 with 40 H.P. A.C. motor.
1—13" Allis-Chalmers Superior McCully.
1—15" Austin.

JAW CRUSHERS

1—24x36" Farrel, Type 15-B.
1—24x50" Champion.
1—24x30" Carroll, all steel.
1—15x38" Wheeling.
1— 8x36" Universal.
1—13x30" Buchanan.

STEEL STORAGE TANKS

Horizontal: 5—10x26', 10x36', 8x24'.
Vertical: 10x30', 10x25', 2—8x30', ¾" plate; 1—40,000 gal. Hemispherical bottom, closed top, 19' dia.

AIR COMPRESSORS

2—Electric driven National Brake, 90 lbs., 300 CFM, incl. 54 H.P. 3/60/550 v. motors.
1—1200 CFM Worthington feather valve, with 3/60/2200 v. syn. motor.
1—2440 CFM Sullivan WN-4, with 500 H.P., 3/60/2300 v. syn. motor.

CRUSHING ROLLS

Single Roll: 30x30" Jeffrey; 18x24", 21x40" and 21x50" Pennsylvania.
Double Roll: 42x16" Allis-Chalmers Anaconda type, at Waukon, Iowa. 36x16" Traylor and Allis-Chalmers.

BALL, ROD AND TUBE MILLS

Tube Mills: 6'6"x22' Hardinge, straight side, iron lined with 300 H.P. direct connected A.C. motor.
2—5'x20' Bonnot silex lined Tube Mills with steel gears and steel heads.
2—6'6"x20' Smidth, silex lined.
1—5'x22' Allis-Chalmers, iron lined.
1—6'x9' Allis-Chalmers, iron lined.
2—6'x16", 8'x30" all iron lined; 6'x22" silex lined Hardinge Conical Mills.

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Our Shops and Yard at Newark, N. J., cover eight acres.

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NEW

ALL STEEL WELDED ELEVATOR BUCKETS OF ANY SIZE. Made with 1/8" or 3/16" Plates.

ALSO

Any size steel bin made to your specifications.

MADE OF NEW STEEL, NOW IN STOCK. IMMEDIATE DELIVERY

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Bucket Elevators—Continuous & Centrifugal
5"x35', 6"x32', 12"x35', 14"x32', 15"x50', 16"x60', 18"x35'-40', 20"x40', 30"x35', etc.
200 Cast & Steel Drive Pulleys.
Selected Lot of Chain, Buckets, Belt, Sprockets for Continuous and Spaced-bucket elevators.
Salem Type Buckets, 5", 14", 16", 18".
Malleable A Buckets, 6", 12", 14", 15", 18", 20".
Continuous Buckets, 12", 14", 15", 18", 30".
700 Feet 20" wide 8-ply Waterproofed Belt.

Belt Conveyors

50 Head and Tail Pulley Assemblies & Drives.
24"x100' Trough Belt Conveyor Equipment.
14"x70' Gravity Roll Sections, rolls 6"-center.

Crushers & Mills

10"x7" Farrel Jaw Crushers, type A and B.
15"x9" Farrel Jaw Crusher, type A.
10"x20" & 14"x24" Champion Jaw Crushers.
8" Traylor Bulldog & 3-K Gates Gyratories.
16"x42" Traylor Crushing Rolls.
16"x24" Corrugated 2-roll Crusher.
8"x8" Harosh Hammer Mill, #1½.
#5 & #6 Williams Jumbo Hammer Mills.
30"x36" American Smooth Crushing Rolls.
American Standard 24" Disintegrator.
4'x30' American Dryer, 5/16" plate.

Vibrating Screens

3'x5' 1-deck Multirap, for wet or dry work.
3'x6' 1-deck Leahy, with A.C. motor.
4'x6' 2-deck & 3-deck Leahy types.
4'x8' 2-deck Robins Shaker & Gyrex Screens.
3'x5' & 4'x7' Hummer Magnetic types.
15-cycle Tyler Generators for Hummer Screens.
#30 Telsmith Rotary Grizzley, with ⅞" Rings.
5'x20' Revolving type, on Trunnions.

Miscellaneous

40-hp. 2-drum Thomas Electric Hoist.
30-hp. 1-drum Mead-Morrison Electric Hoist.
15-hp. 1-drum Lidgerwood Gasoline Hoist.
15-hp. Sprague Electric Car Pullers, 10-ton.
36"-g. Whitcomb 8-ton & Vulcan 4-ton Locomotives.
30"-g. Electric Mercury Locomotive. Batteries.
10—24"-g. Flat Cars, with 54"x12' wood decks.
2—24"-g. Turntables. Also Gear Reducers.
35-ton Tank Scale and 2000 lb. Kron Dial Scale.
Hoskins Electric Muffle Type Furnace.
Centrifugal Electric Water Pumps, 2" to 6".
Clamshell Buckets, ½, ¾, 1¼, and 1½-yd. cap.
½-yd. Koehring Batch Mixer. Flywheels to 8' dia.

G. A. UNVERZAGT
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1—30-ton cap. 43-B Bucyrus-Erie Gas Crane and Dragline, 60' Bm. 1½ yd. Dragline Bucket, also 1¾ yd. shovel attach.

1—Lorain-40—8½ ton cap. Truck-Crane, 25-40' Bm. ½ yd. CS. 4-sp. Mack pneumatics, also ¾ yd. shovel attach.

1—Lorain Tunnel Shovel Boom 16' long and Stick 14' long, fits L-75, 77 and L-80 machines.

2—Allis - Chalmers Model - L gas driven 75 HP. Tractors with Baker Hydraulic Bulldozers.

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We are helping the Government locate good used equipment for vital war construction projects. Please advise us if you have Crawler Cranes, Locomotive Cranes, Backdiggers, Draglines, Truck-Cranes, Shovels, Scrapers, Bulldozers, Air Compressors, Rollers, etc., for sale or rent.

GREY STEEL PRODUCTS CO., INC.
74 Central Ave., Glen Rock, N. J.
Tel. Ridgewood 6-2275

FOR SALE

1—24"x36" Type 15B Farrel Jaw Crusher.
1—15"x30" Farrel Jaw Crusher.
1—13"x24" Farrel Jaw Crusher.
1—11"x22" Climax Jaw Crusher.
1—20"x50" Champion Jaw Crusher.
1—No. 37 Kennedy Gyratory Crusher with Synchronous Motor and Switches.
1—No. 19 Kennedy Gyratory Crusher with Ball Bearing Motor, Drive, and Push Button Starter.
1—No. 13B Telsmith Gyratory Crusher.
1—No. 10A Telsmith Gyratory Crusher.
1—No. 40A Telsmith Gyratory Reduction Crusher.
1—No. 32B Telsmith Gyratory Reduction Crusher.
1—36" Telsmith Gyrasphere Crusher.
1—3' Traylor Finishing Crusher, Gyratory Type.
1—6" Superior McCully Finishing Crusher.
1—42"x36" Type B Jeffrey Ball Bearing Hammer Mill.
1—21"x42" McLanahan ST-7 Single Roll Crusher with Drive.
1—4'x10' Telsmith Triple Deck Pulsator Screen.
1—D17000 Caterpillar Power Unit.
1—12" Hetherington & Berner steel pontoon hull Swintek Dredge with 300 HP Motor.
1—24"x70' Barber-Greene Steel Truss Conveyor with Electric Motor and Drive.
1—1¼ Yd. Lima Shovel.
Revolving Screens, Elevators, Conveyors, New Conveyor Belts, and other Quarry Equipment and Supplies.

BLUE BALL MACHINE WORKS
Blue Ball, Pa.

Buda D-4 Diesel, 4 Cyl. 6"x8" available now, with Radiator, housing, two cyl. gas start engine, clutch & pulley. 90 HP.
Wisconsin DT-4 6 Cyl. 108 HP. 5¾x6½ Housed, Elect. starter & battery clutch—radiator—outboard 13" Dia. x 12" face pulley. This engine precision rebuilt by expert. Both engines bargains, $1500.00 each disc. for two.
Lima 1¼ yard Comb. shovel & crane, reconditioned & wkng, Okla. Available for heavy duty rock service. Get it before too late.
Three Universal new No. 3 Hammermills, for Aggre. lime, 1—15x36 Jaw with 60 Cat power. One 240' Gardner-Denver V type Compr. first class, $1200.00. Two 2-ton Cats. Tarvin Mill, several engines, gas power. Rock plants.
RD 7 with LeTourneau Angle dozer, appearance and cond. first class.
Byers ¾ & ½ Yard Gas Comb. shovel & cranes. Both machines bang up and ready to go with latticed angle sectional booms. Bulldog & Heavy Duty shovels, priced right. (KC & St. Louis locations.)
20"x36" Roller bearing Jaw primary, 40"x20" Double Rolls, Apron feeder, 4'x12' Double deck screen, conveyors, bin, complete, like new.
9"x36" Roller bearing jaw, 30"x18" Rolls, 2 deck screen, twelve tire mtg, air brakes. Complete plants. Conveyors & drives.
Byers 62 & Lorain 37 shovel Attch., ½ & ⅝ size.

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2136 Jefferson St. Kansas City, Mo.

FOR IMMEDIATE SALE

D-13000, 6 cylinder, Caterpillar Diesel Engine, #5E2234, including 150 gallon fuel tank	$2500.00
KOP 4 cylinder, Cummins Diesel Engine, #13198, 141 peak horse power, at 800 RPM, complete with all standard equipment plus starting equipment	5125.00
PD-40 International Power Unit with clutch, welded base, and electric starter	1200.00
Sullivan portable air compressor, 220 cubic feet, #12247, mounted on 4 steel wheels	500.00
No. 6, Style "K" Gates crusher, #6230	1750.00
American Type C, 16"x30" Pulverizer, #1545	750.00
Farrel Jaw Crusher, 36"x18", #B-5116	850.00
No. 1 Jumbo Williams Hammer Mill, 30"x15", #8556	550.00
Continuous Bucket elevator, belt 16" wide, 105 feet long, with 95 buckets each 16"x8"x11⅝". Price	600.00
Continuous bucket elevator, belt 18" wide, 100 feet long, with 62 buckets each 16"x12"x17⅝". Price	600.00
Revolving Screen, 60 inch diameter x 24 feet long	1300.00
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Fairbanks Self Contained Ten Ton Capacity Truck Scale, #11926	160.00
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1—**Compressor,** portable Ingersoll - Rand, "Mobilair," 2-stage, air cooled, 315′ capacity, powered by Model UD 18 International Diesel Power Unit with electric starter, mounted on four pneumatic tired wheels, practically new. Price.....$ 6,000.00

3—**Crawler Wagons,** Athey bottom dump, 18 cu. yd. capacity. Six months old, in good operating condition. Price each.... 2,250.00

1—**Road Pump** "High Pressure," Gorman Rupp Triplex Road Pump, Model R80 practically brand new. Equipped with 6 cylinder, 45 Horse Power Hercules engine, 4" suction, 3" discharge, rated capacity 80 to 110 G.P.M. Pressure 385 lbs. to 500 lbs. This pump absolutely same as brand new. Price..... 1,500.00

1—**Rollers,** three wheel, Huber ,10 ton, reconditioned in our shop and ready to go. Price each 2,500.00

2—**Rollers,** three-wheel Buffalo-Springfield ten ton, A-1 Condition. Price each..... 3,500.00

1—**Concrete Paver,** Model 27E Koehring, with boom and bucket, equipped to meet Indiana State Highway requirements, just finished a job. Price..... 2,250.00

1—**Locomotive,** Plymouth, 8-ton, standard 56" gauge, Type C, Model DLC, powered by gasoline engine. In good operating condition. Price 2,250.00

1—**Locomotive,** Plymouth, 8-ton, 36" gauge, Model BTU, powered by Buda gasoline engine. In good operating condition. Price 2,500.00

1—**Locomotive,** Whitcomb, 8-ton, 36" gauge, Type MA, powered by Climax gasoline engine. In good operating condition. Price 2,500.00

1—**Compressor,** Davey, two-stage, mounted on steel channel base, powered with "Caterpillar" D6600 Diesel Power Unit. Capacity 160 c. f. actual air. This unit thoroughly reconditioned. Price..... 2,500.00

1—**Cableway,** Sauerman, 5-ton tautline with cable sheave and equipment 540-ft. working span. Price..... 1,250.00

1—**Coal Conveying System,** Godfrey, consisting of Model FS3, 2-drum hoist complete with 10 Horsepower Westinghouse Electric Motor, AC 3-phase, 60 cycle, 220 volt, 2-ton trolley, 30 c. f. Clamshell Bucket, with open top, automatic trip hopper which fits on hopper bottom of car, and 80 to 90 ft. overhead track with necessary hooks and blocks. Costs New $4,000.00. Price .....$ 1,750.00

1—**Lime Pulverizer,** Gruendler, 2XA. Practically new. Price..... 950.00

1—**Reduction Crusher.** Telsmith Intercone, size 28". Brand new, only operated 5 days, bought 1941, equipped with V-belt sheave. Price 3,995.00

2—**Crawler Wagons,** LaPlant-Choate, hydraulic control, side dump rock type, 10 yd. capacity with tractor pump. Each... 1,850.00

2—**Dumptors, Koehring,** 5.7 cu. yd. capacity, Model W55, all have good tires, and in good condition. Price each..... 2,675.00

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1—**Shovel-Crane** Combination, Lorain, Model 30, ½ yard capacity, powered by Waukesha gasoline engine, equipped with 30 foot crane boom. Good operating condition. Price..... 6,750.00

2—**Tamping Rollers,** Euclid, double drum. Good operating condition. Price each.. 750.00

1—**Light Plant,** Kohler, Model D, 1500 watts; good operating condition. Price..... 300.00

1—**Generator Set,** Marble Card, 5KW, Compound, 4-cyl. Leroi engine, 115 volts, good operating condition. Price..... 550.00

1—**Light Plant,** Delco, 850 watt, 32 volt, air cooled. Good operating condition. Price 150.00

DEPENDABLE USED EQUIPMENT

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165′ boom—adjustable for height.

250 HP Hoist Motor—5 ton aluminum car (counter balanced).

All electric with cab control. Caterpillar mounted with individual travel and steer motors.

Ideal for disposing of material from short-boom shovel.

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Two Jackson & Church automatic presses. Capacity 3200 concrete brick per hour. No pallets used. Complete with supply tanks.

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One No. 6 CHAMPION Crusher, Manganese Jaws. Capacity at least 50 tons per hour. Used Very Little. Owner has no further use for it. Priced to sell immediately.

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FOR SALE

1—American Hoist, 2 drum, Dragline, ½ yd. Sauerman Scraper
1—Telsmith Screw Stone Washer
1—Case Jaw Crusher
1—Telsmith Shaker Feeder
1—35′ Belt Bucket Elevator
Electric motors ranging from 5 H.P. to 30 H.P. Starters and switchboxes, 3 phase, 60 cycle, 220 volts.

SHEBOYGAN SAND & GRAVEL CO.
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FOR SALE

1—No. 5 AUSTIN Gyratory Crusher, 12" opening, with babbitting mandrels. Cheap before removal.
1—4½" TRAYLOR Gyratory Crusher, Type T.

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Erie 100 ton 3 compt. bin with weigh batcher.
B.K. 250 bbl. Cement Bin complete.
Various Floor Hoppers, Britches and Tremie.
Blaw-Knox complete ready mix concrete plant.
200 ton rock storage bin, steel, heavy construction.
Fuller Kinyon bulk cement unloader, portable.
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Ransome 28-S 1 yd. Stationary mixer, elec.
Ransome Dual drum paver 27E.
Koehring 27E Paver, boom and bucket.
Barber-Greene Model 62 loader, cats.

SPECIALS!!

15"x30" Traylor Jaw Crusher.
3—30,000 gal. Asphalt Tanks.
2—Ruggles-Cole Rotary Driers 6'x30', 7'x35'.
Allis-Chalmers cent. pump, electric, 3500 GPM, 50'.
2—Asphalt Mixing Kettles, 5,800 gal. each.
Steel Building 54'x110'x42'.
Sullivan Air Compressor 1051 cu. ft. F-Morse oil engine.
Sullivan Air Comp. 110 cu. ft., gas, port.
Road forms 8000 ft., 10"x6", 9"x8", 8"x8".
Steel Pipe 14,000 ft., 2", 2½", 3".

BUCKETS—STONE SKIPS

22—Steel stone skips, 2 to 3 yds.
1 yd. Hayward rehandling clamshell.
Haiss 1 yd. rehandling clamshell.
2—⅝ yd. Haiss rehandling clamshell.
⅝ yd. Haiss rehandling clamshell.
1 yd. Hayward orange peel, 4 leaf.
¾ yd. Hayward orange peel, 3 leaf.

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Marion Model 125 elec. Shovel, 3½ yds.
Bucyrus-Erie 43B Diesel Shovel, 1¾ yds.
Bucyrus-Erie Model 1030 electric tunnel shovel.
No. 50-B Bucyrus-Erie electric shovel, 2 yds.
Bucyrus-Erie 50B Steam Shovel, 2 yds.
Link-Belt Crane, gas, 50' boom, 1 yd. cap.
Brownhoist Crane, gas, 40' boom, 1 yd. cap.
Osgood Conqueror Gas Shovel, 1¼ yds.

LOCOMOTIVES—CARS

2—Vulcan 6 ton, gas, 36" gauge.
1—Whitcomb 4½ ton, gas, standard gauge.
2—Porter 13 ton, Saddle Tank, steam, 36" gauge.
8—3 yd. V type 36" ga. side dump cars.

CRUSHERS—PLANT

Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 32, 8A, 8B; Traylor 8"; McCully 13", 8", 6".
Jaw: 6x12, 9x16, 10x20, 12x26, 13x30, 15x30, 16x32, 36x48.

RICHARD P. WALSH Co.
30 Church St. New York, N. Y.

FOR SALE

Following Motors for 3/60/220

1—2 HP mtr., 1800 RPM. | 1—35 HP mtr., 900 RPM.
1—5 HP mtr., 1800 RPM. | 1—1 HP mtr., 1800 RPM.
1—7½ HP mtr., 1800 RPM. | 1—15 HP mtr., 1200 RPM.
1—30 HP mtr., 900 RPM. | 1—50 HP mtr., 900 RPM.
1—50 HP slipring motor, 1200 RPM.
1—300 amp., 3 pole knife switch.
1—Type ¾ 100 HP Diesel engine direct connected to 75 KW generator.
1—75 KW G.E. generator complete with exciter and panel.
1—110 HP I-R, Type PO oil engine, size 17x19.

COMPRESSORS

1—Type ORC-3, I-R steam driven compressor, 100 lbs. air press., 150 lbs. steam condensing, 4384 cu.ft.
1—Sullivan angle compound compressor, plate valves, 1094 cu.ft. Good condition.
1—I-R Type XB-2 compressor comp., 888 cu.ft. and 150 HP slipring motor 2200/3/60.
1—I-R Type XRB-2 compressor, 11 and 7x10, 327 cu.ft. Excellent condition.
1—I-R Type XB-2, 12 and 7½x12, 338 cu.ft.

MISCELLANEOUS

1—Worthington Cent. pump, 150 gals., 100', 10 HP, no motor.
1—Cameron Cent. pump, 120 gals., 220', 10 HP, no motor.
1—Steam driven Blondin cableway, 2 tons, 600' long, 50 HP motor.
1—Blondin cableway, steam hoist, 2 drum, 2000' long, 10 tons.
1—No. 8 Lawrence Vortex pump conn. to 50 HP motor, 1250 gals. 60'.
1—5 ton Shepard electric hoist, 1 motor, monorail trolley.
3—Steel riveted air tanks, 3'x6', 100 lbs. pressure.
1—40 ton Lane traveling crane, 45' span. Motors for 3/60/220.
1—10 ton Lane traveling crane, 50' span. Motors for 3/60/550.
1—10 ton Lane traveling crane, 40' span. Motors for 3/60/220.
1—Guy derrick 80' mast, 70' boom. Hoist, turning gear, and all ropes.
1—Back block derrick 100' mast, 90' boom and hoist with 50 HP motor, turning gear, etc.
1—Maine Electric Co. hoist complete 50 HP motor. Excellent condition.
1—100 HP Ames boiler, R.T. economic type. Good cond.
1—50 HP steam vertical boiler, trap and all piping.
1—Type D Dupont trip hammer.
2—Heavy anvils.

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DIESELS

93 KVA Allis-Chalmers 3/60/240 v. Atlas Imperial Diesel Generator.

150 HP. Fairbanks-Morse Type Y Engine.

120/180 HP. Fairbanks-Morse, 1200 r.p.m. Diesel engine with Clutch and Radiator.

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AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

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4—1 150-ton Blaw Knox, 1 35 ton Blaw Knox, 2 30-ton Johnson. Above with or without weigh batchers.
All of the above are 2 comp. bins

CABLEWAYS

1—Lidgerwood 15 ton cap. cableway, 2300' span, with Lidgerwood 12¼x15 steam. hoist, with or without steel towers.

CRANES, DRAGLINE AND SHOVELS

1—Link Belt, K-48, Ser. No. 1728, 60' boom, 2 yd. bucket.
1—P&H, Model 655A, Ser. # 6526, 45' boom and 1½ yd. shovel attachment. Diesel powered.
1—Lorain, Model 77, Ser. # 9163, with 1½ yd. shovel front. Diesel powered.
1—Link Belt K42, Ser. # 1265, 45' boom, 1¼ yd. bucket, also 1¼ yd. pullshovel attachment.
1—Northwest Model No. 5 Ser. No. 3572, 50' boom with 1¼ yd. pull shovel attachment.
1—Northwest model 104, Ser. No. 1386, 45' boom, 1¼ yd. bucket; with 1 yd. trench hoe attachment.
1—P&H, Model 650, Ser. # 4173, with 40' boom and 1¼ yd. shovel attachment.
3—Northwest Model No. 4's, Ser. Nos. 3441, 3445, 3493, with 40' boom and 1 yd. pull shovel attachments.
2—Erie, gas air, 2 yd. Ser. No. 4365, 9758, with 45' boom and shovel attachment.
1—Osgood Heavy Duty, Ser. No. 2069 and 40' boom, 1 yd. bucket and with 1 yd. shovel attachment.
1—Osgood "Commander" ¾ yd., 30' boom, Ser. No. 2403 with ¾ yd. bucket.
1—Thew ¾ yd. Gasoline Shovel with ¾ yd. shovel front and 40 ft. crane boom. Serial No. 2801.
1—Koehring Model 301, Ser. 544 and 40' boom, ¾ yd. bucket.

1—Byers Bearcat model 27, Ser. No. 5289, 30' boom. ½ cl. sw. ½ yd. bucket.
1—Erie Steam Crane, 40' boom with or without ¾ yd. shovel front.

CRUSHERS

4—Jaw Crushers: 1—12"x20" Acme; 1—10"x20" Climax; 1—9"x16" Acme.
2—Gyratory Crushers: 1—No. 5 Allis-Chalmers; 1—No. 5 Austin.
1—Crushing Rolls: Size 42"x16" Allis-Chalmers.
8—Steel guy derricks; 5—20 ton American Terry, 90' mast, 80' boom; 1—15 ton Terry, 115' mast, 100' boom; 1—10 ton Leverington Gerrigan, 100' mast, 90' boom; 1—4 ton Bedford, 90' mast, 80' boom.
2—Steel Stiff Leg derricks; 1—15 ton Just, 24' mast, 65' boom, 1—10 ton American Terry, 45' mast, 110' boom.

HOISTS

55—Electric ranging from 20 H.P. up to 120 H.P. Consisting of triple, double and single drum with AC or DC motors. Have attached swingers for some.
Gas—hoists ranging from 8 to 120 H.P. single, double and triple drums.

PUMPS (DREDGE)

2—10" Morris Dredge pumps. 1 to direct connect to motor, other belt drive.
4—Belt driven: 3 Morris Mang., 1—8"; 2—6"; 1—8" Cataract.

TRACTORS

2—Fordson tractors, equipped with winches.
1—Taylor tractor, Mdl. A-16-30.
1—Fordson Caterpillar tractor.
2—Allis-Chalmers, Mdl. L. 12 ton, No. L638, 684, with Baker Hyd. Bulldozers.
1—Allis-Chalmers, Mdl. 75, Ser. No. 7049, 12 ton gas powered.
5—Caterpillar, 1 Mdl. 65, 2 Mdl. 60 12 tons; 2—mod. 30, 5 ton, 1 with derrick attach.; 1—Mdl. 60 has LaPlant Choate bulldozer.

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PITTSBURGH P. O. Box 933 Dept. PQ
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Width	Ply	Top & Bottom Covers
48"	8	1/8" — 1/16"
42"	5	1/8" — 1/16"
36"	6	1/8" — 1/16"
30"	6	1/8" — 1/16"
30"	5	1/8" — 1/16"
24"	5	1/8" — 1/32"
24"	4	1/8" — 1/32"
20"	5	1/8" — 1/32"
20"	4	1/8" — 1/32"
18"	4	1/8" — 1/32"
16"	4	1/8" — 1/32"
14"	4	1/16" — 1/32"
12"	4	1/16" — 1/32"

TRANSMISSION BELTING HEAVY-DUTY— FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

ELEVATOR BELTING HEAVY DUTY— RUBBER COVERED

Width	Ply	Top & Bottom Covers
12"	6	1/16" — 1/16"
14"	6	1/16" — 1/16"
16"	6	1/16" — 1/16"
18"	6	1/16" — 1/16"

ENDLESS "V" BELTS

"A"—WIDTH—All Sizes
"B"—WIDTH— " "
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30 ton Standard Gauge Gasoline Locomotive.
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180 HP Fairbanks Morse Diesel—Also others.
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Hoists, Derricks, Locomotives, Cars, Boilers, Compressors, Engines.

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Barber-Greene Loader, Model 62. Complete, but not in running order. For sale as parts.

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USED CRUSHING MACHINERY

1—Telsmith Gyratory Primary Crusher, All Steel, Size 16-a.
2—Traylor Heavy Duty High Speed Crushing Rolls, 54"x24".
Largest stock of used mining machinery in Middle West.

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Surplus Equipment
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1—Brownhoist 80 Cu. Ft. Clam Bucket.
1—McMyler 2 Yard Clam Bucket.
1—Northern Conveyor.
1—Blaw-Knox Storage Bin. Cap. 50 Yds.
Address all inquiries to
BOX 412

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TRAYLOR CIRCULAR SCREENS

For Immediate Sale
Heavy Duty 4' x 16'

DUTCHESS QUARRY & SUPPLY COMPANY
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FOR SALE

1 Jackson & Church sand lime, or concrete brick machine. 12 pockets, capacity 2500 brick per hour. Good condition. Bare machine with no accessories. Located Cass City, Michigan. Inspection invited. Priced to sell.

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DUMP CARS, 1½ yard, 36" gauge, roller bearing. Very good condition. Attractive price.

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2—120 HP Full Diesels—Ex. Cond.
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1—112 HP Buda and 25 HP Diesel.
1—¾ Yd. Diesel Shovel and Dragline.

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Used Equipment—All Kinds.

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45"x60" Robins Vibrex Screen—2 deck.
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Sand mining property in La Salle Co., Ill., along Rock Island R.R. 15 acres and 19 acres. Immediate possession.

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WANTED IMMEDIATELY!

STRUCTURAL STEEL BUILDING

Minimum 80' x 400'

Crane runway capable of 20 T. crane support.

We will purchase with or without crane.

Submit specifications

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BOX 515

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WANT TO BUY

2—40 to 60' Portable Conveyors.
20 Ton or Heavier Gas Locomotive.
80 to 125 HP. 3 Drum Hoist.
Locomotive Crane.
2—10,000 gal. or 1 Large Storage Tank.
2 Miles Portable Track.
24x36 Jaw Crusher.
100 ft. Boom Whirley Crane.

Address replies to

BOX 509

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Good used small size concrete batching plant: one 1½ yard truck mixer, including chassis; one high lift shovel.
Address

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Used Brooks Load Lugger or Dempster Dumpster unit, 1½ yard capacity. Must be in good condition.

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SCREENING & LOADING PLANT, used Cedar Rapids portable gravel screening and loading plant, O.P.O. Type, with Waukesha four cylinder 4x5 gasoline engine with radiator, clutch, gas tank and housing, mounted on truck in place of crusher; 1¾" round opening revolving screens; 30 ft. feed conveyor with hopper; 40 ft. delivery conveyor; with 18" belts on feed and delivery conveyors, capacity 75 to 100 tons per hour. Excellent condition.

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DEPENDABLE USED MACHINES

Haiss loader, rebuilt.
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Cedar Rapids duplex portable gravel plant.

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2-drum, 2-speed, 100 H.P. AC Motor, 220V-60C-3Ph, complete with starter and entrance switches, other accessories. Good running condition, ready for immediate shipment. Priced right.

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Locomotive Cranes, of any Size, for Cash.

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WANTED

25-35 Ton Loco Cranes

10 Ton 87" Bridge Cranes

15 Ton 60" Bridge Cranes

State Age, Full and Complete Description with Price.

Address replies to
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PIT AND QUARRY PUBLICATIONS
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Locomotive cranes 15 to 50 ton capacity. Also any gantry or crawler cranes. Let us know what you have for sale.

THE ACME EQUIPMENT COMPANY
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WANTED

Wisconsin manufacturer of rock, ore and gravel handling machinery wants engineer to design portable crushing plants. Permanent position for right man. Give age, complete outline of experience and salary expected.

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Executive to take full responsibility of Sand and Gravel Plant involving river operations. Must have technical education or equivalent, with ability to plan and supervise operations, including production and maintenance. Experience in managing river fleet essential. Applicant state age, full details of past record, experience, earnings and education in first letter.

Address inquiries to
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1—Farrel jaw crusher, size 15x24. In excellent condition at a very reasonable price.

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Surplus
Equipment

IMMEDIATELY AVAILABLE

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2—**BUTLER** bins, 72-yard, single compartment, single opening.

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BLAW-KNOX 1½-yard Model 620 General Purpose, excellent condition.

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CLYDE 75 h.p. 2-drum hoist & swinger, 10,000 lb. line pull, gasoline, or without power.
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BROWNING No. 1, 20-ton Steam Locomotive crane, 50' boom, 8 wheel standard gauge. In good condition.
McMYLER Steam Crawler Crane, 50' boom, High gantry, long cats, oil burning boiler. In good condition.

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1—Tyler 3' x 5', 2 deck Vibrating Screen
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14 ft., 8 ft. and 12 ft. Separators

ROLL CRUSHERS
36x60 Fairmont Single Roll.
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10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

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18 in., 24 in., 30 in., 86 in. and 48 in. Symons Disc.
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Gruendler No. 6X.

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72 Ton BLAW-KNOX 2 Compt.; also 250 ton.
100 Ton BLAW-KNOX 2 Compt.

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400 Bbl. Portable BUTLER Bulk Cement Bin with Fuller Full Automatic Electric Push Button Weigh Batcher.

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100 K.W. RIDGWAY 3/60/2200-250-275 volt.
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RAYMOND MILL
5 Roll High Side.

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Head & Tail—Pulleys—Takeup for all sizes.
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36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 8 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft., 5x30 & 8x84 Double Shell Dryers, 8x110, 7½x100, 8x125 & 10x20 Kilns.

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30" Reciprocating Plate Feeder.

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12—50 Ton Cap. Battleship Gondolas.
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SAUERMAN DRAG AND SLACKLINES
1—¾ yd. Gas 1—1½ yd. Electric
1—1 yd. Electric 3—2 yd. 3 yd. & 4 yd. Electric

42 IN. BELT CONVEYOR
350 Ft. Barber-Greene Sectional Steel Frame Roller Bearing Belt Conveyor. New 1939.

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21 Worthington 169 Drifters.
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6 Gardner-Denver 15 Jackhammers.
45 Ingersoll-Rand Drifters S70, N75, X71, DA35.
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125 Ton 56' x 10'6" Platform 4 Section.

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1—**BYERS** Gasoline 1¼ yard Shovel and Crane Combination.

1—**CATERPILLAR** Diesel Auto Patrol Grader. Model 10. Dual drive with scarifier.

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1—**P & H** Model 900 Diesel Shovel. 40' Boom, 22' Sticks. Choice of 3 or 3½ yard dipper.

1—**KOEHRING** Model 401. Gasoline operated. 50 ft. Boom. One yard bucket. 8 years old.

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PHILADELPHIA, PENNA.
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2—1200 Chg. Pneu. Class OCB Belted Air Compressors.

10x20 Champion Jaw Crusher.

41-B Bucyrus 1¼ yd. Cap. Steam Shovel attachment.

6x8 Lambert Steam Swinging engine.

30 HP Single drum Elec. Hoist.

4—1½ yds. V 36 ga. Dump Cars.

450 ft. 36 In. conveyor belt.

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FOR SALE

One 8x9 Sullivan compressor, belt drive, on trucks.
Cleveland H-11 jackhammer, Timken 1" steel, 2' to 20' inclusive, bits, 50' air hose and oiler.
250' 2½" pipe and fittings, some 3" pipe.
60' guy derrick white oak mast and guys.
8x12 Universal jaw crusher.
Woods heavy duty 2½ yd. dump body and hoist.

All of above in excellent condition.

WORRELL AND HUSTON
Hope, Indiana

HOIST MOTOR
150 H.P. 690 RPM. 3/60/2200, General Elec. ITC

SLIP RING MOTORS
80 HP. 900 RPM. 3/60/440, General Elec. MT
150 HP. 600 RPM. 3/60/220, General Elec. IM

SQUIRREL CAGE MOTORS
200 HP. 450 RPM. 3/60/440, General Elec. IK
300 HP. 600 RPM. 3/60/440, Ideal 2 bearing

AIR COMPRESSOR
9x8 Gardner horizontal 173 CFM. 100 lb. 300 RPM.

LEATHER BELT
37½" wide 3 ply leather 42 feet long

M-G SET
75 KW. 125 volt DC Ideal 3/60/440 V. AC motor

DIESEL GENERATOR
125 KVA. 3/60/220 volt Fairbanks-Morse dir. con. 150 HP. type Y, style V. 3 cyl. oil engine

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6" Fair.-Morse 1000 GPM. 195' head motor driven

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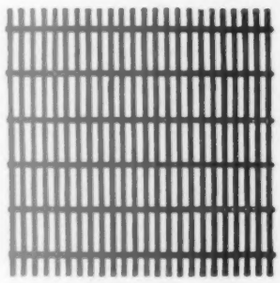
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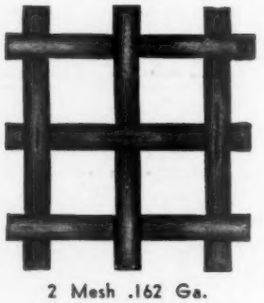
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THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO

61% of all Safety Directors Say— "Use Preformed Wire Rope to Reduce Accidents"

EXCERPT FROM PAGE 62, Dec. 1941 "NATIONAL SAFETY NEWS"

Preformed Rope Reduces Injuries

Preformed rope, according to returns from the questionnaire, has been adopted by many companies in order to avoid barbs caused by ends of broken wires. Preformed rope does this in two ways: first, the wire ends do not stick out from the rope when the wire breaks, but continue to lie in position against the rope body; and second, the high resistance of preformed rope to fatigue results in fewer wire breaks developing in a working rope, all other things being equal.

"Buy only preformed rope," cautions the safety engineer of a large automobile company, "since it is safer and cheaper in the long run." The safety officer of a federal government agency says, "There is far more likelihood of workers receiving puncture injuries while handling non-preformed rope than from the preformed type." A metal mine reports that their injury rate and compensation costs due to hand injuries from handling slusher ropes dropped to almost zero when they changed to preformed rope, and two other mines corroborated this report from their own experience. A rubber company says, "We definitely favor preformed rope." Other companies report similar experience.

AMERICAN CABLE

TRU·LAY *Preformed*

When asked, in a survey, how to reduce accidents to workmen handling wire rope, 61% of all Safety Directors said: *"Use Preformed Wire Rope."* American Cable **TRU-LAY PREFORMED WIRE ROPE** means steadier machine operation and greater production. All American Cable ropes made of Improved Plow Steel are identified by the Emerald Strand.

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- **will enable you to speed up production SAFELY**
- **and at the same time insure absolute precision of formula proportioning**
- **and constant uniformity of product . . . . . .**

WITNESS — Through the use of the improved Schaffer Poidometer with motor operated gate, a mid-west cement company (name upon request) greatly improved the quality and uniformity of its product, stepped up the daily output and accomplished a marked saving in labor.

Many other cement plants throughout the country are experiencing similar results. Schaffer Poidometers are being used for weighing and feeding materials into all types of grinding mills in a wide variety of industries. They are of proven value in any plant or operation requiring correct proportioning of pulverized, granular or crushed materials containing up to 4" cubes.

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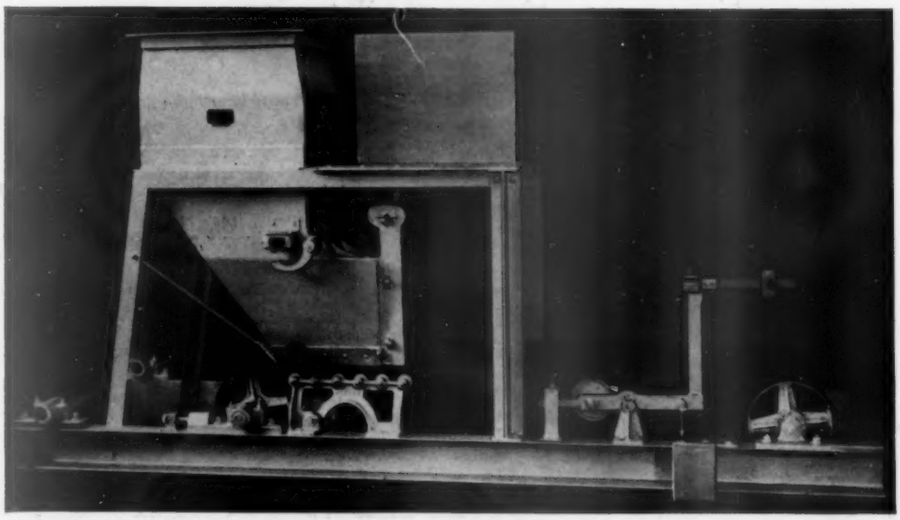

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